FIG. 1

VIDEO PRODUCTION STUDIO
204

INDEPENDENT FINANCIAL PROVIDER
212

CONSUMER/ AUTHOR
206

205

INFORMATION UTILITY
200

INFORMATION DELIVERY SERVICE
216

CONSUMER
208

PUBLISHING HOUSE
214

202

OFFICE
210

100

FIG. 1A

TO VDE PARTICIPANT N

TO VDE PARTICIPANT 1

TRANSACTION PROCESSOR — 200b

USAGE ANALYST — 200c

REPORT CREATOR — 200d

202(N)

202(1)

SWITCH(ES) — 200a

CONTENT & MESSAGE STORAGE — 200g

REPORT RECEIVER — 200e

VDE ADMINISTRATOR — 200h

PERMISSIONING AGENT — 200f

INFORMATION UTILITY 200

FIG. 2

FIG. 2A

CONTENT CREATOR
102

RULES AND CONTROLS

DISTRIBUTOR
106

RULES AND CONTROLS

MODIFIED

ADDED

UNCHANGED

REPLACED

CONTENT USER 112

FIG. 3

REQUEST

"NO GO"

402

"GO"

USAGE
REPORT

METER

404

BILL/REPORT

20
20
20

BILLING

406

408

OVER BUDGET

BUDGET

SUPPLY CONTENT TO USER

TYPE OF USAGE

DISPLAYING PROPERTIES PRINTING COPYING DISTRIBUTING

HOW TO PAY

MASTER CARD COMPANY CREDIT AMEX

CHARGE BY UNIT

FRAMES TIME BYTES

COST OF UNIT

$.5/ KB. $1.2 PER MIN. $5.9 EACH VIEWING $2.0 FINAL USE

WHEN TO REPORT

WEEKLY EACH USE MONTHLY DAILY

METERING RULES CONTROLS

FIG. 4

FIG. 5A

300

CONTENT
CONTAINER

302

INFORMATION CONTENT
304

PERMISSIONS RECORD
808

BUDGETS
308

OTHER METHODS
1000

FIG. 5B

INFORMATION CONTENT 304

TEXT, AUDIO,
VIDEO, SOFTWARE

PERMISSIONS RECORD 808

RIGHTS:
USAGE
DISTRIBUTION
ADMINISTRATION
METHOD REQUIREMENTS
METHOD OPTIONS
KEYS

300

302

CONTENT
CONTAINER

INFORMATION CONTENT
304

PERMISSIONS RECORD
808

BUDGETS
308

OTHER METHODS
1000

BUDGETS 308

LIMITATIONS ON ACTIVITIES
APPLY TO ONE OR MANY
USE IN SECURITY
MANY PARAMETER TYPES
INTEGRATED WITH BILLING
POSITIVE CONTROL PATH

OTHER METHODS 1000

METER, BILLING, AUDIT, ENCRYPT,
DECRYPT, ACCESS, EXTRACT, EMBED,
REGISTER, FINGERPRINT, OBSCURE,
SERVICES, PROCESS, CONTENT,
INFORMATION

FIG. 6

510 APPLIANCE LINK

502

508 FIRMWARE

506 HARDWARE

504

505

SPU 500

SECURE PROCESSING ENVIRONMENT 503

TAMPER
RESISTANT
BARRIER

FIG. 7

ELECTRONIC APPLIANCE
600

613
VOICE
RECOGNITION

612

614

602
"RIGHTS
OPERATING
SYSTEM"

500

SPU
604

608

USER
APPLICATION(S)

606

OTHER OPERATING
SYSTEM FUNCTIONS

SECURE
DATABASE

610

VDE
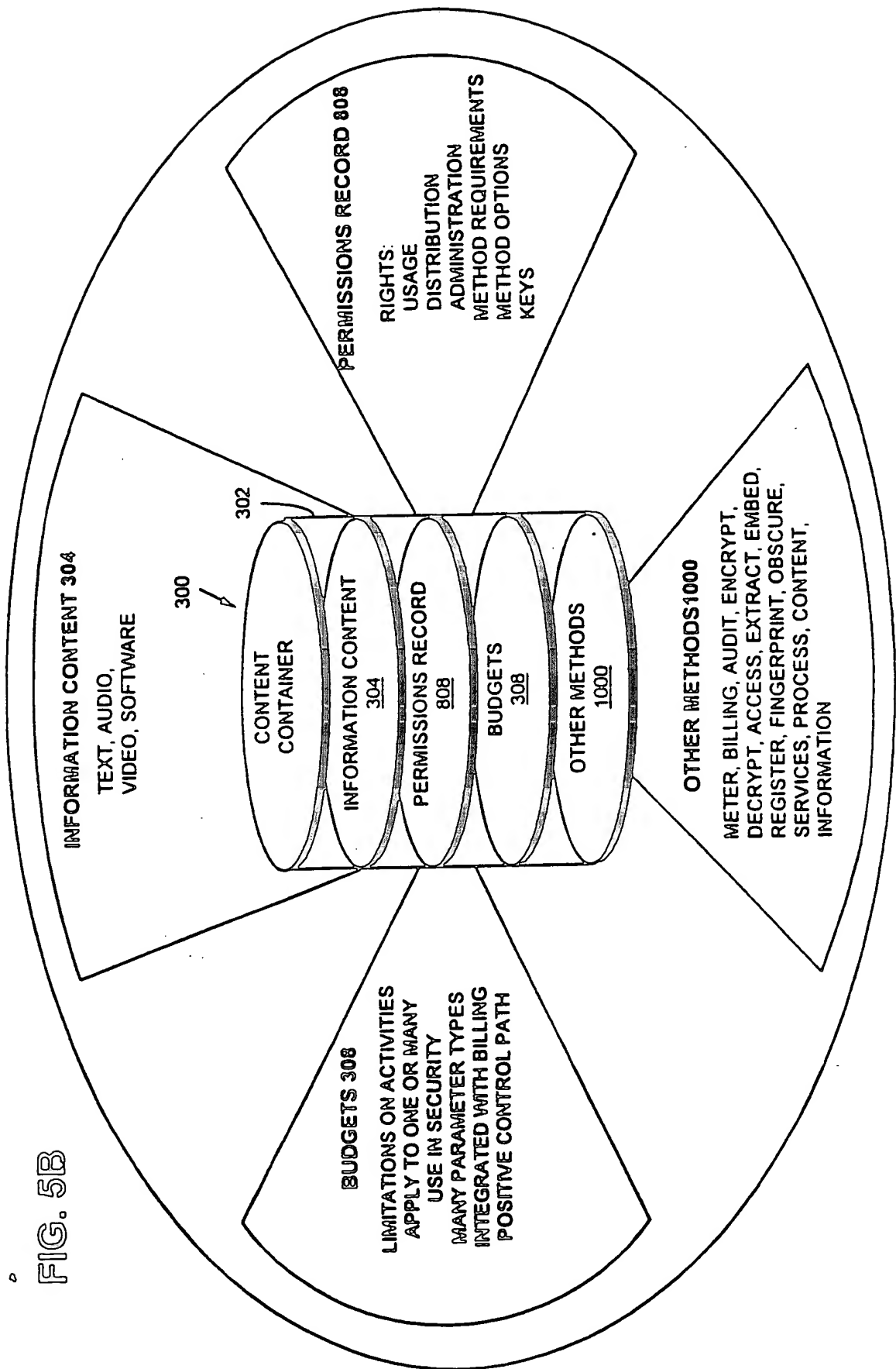RIGHTS AND AUDITING
OPERATING SYSTEM
FUNCTIONS

MODEM
618

620

622

624

SCANNER

626

CABLE

628
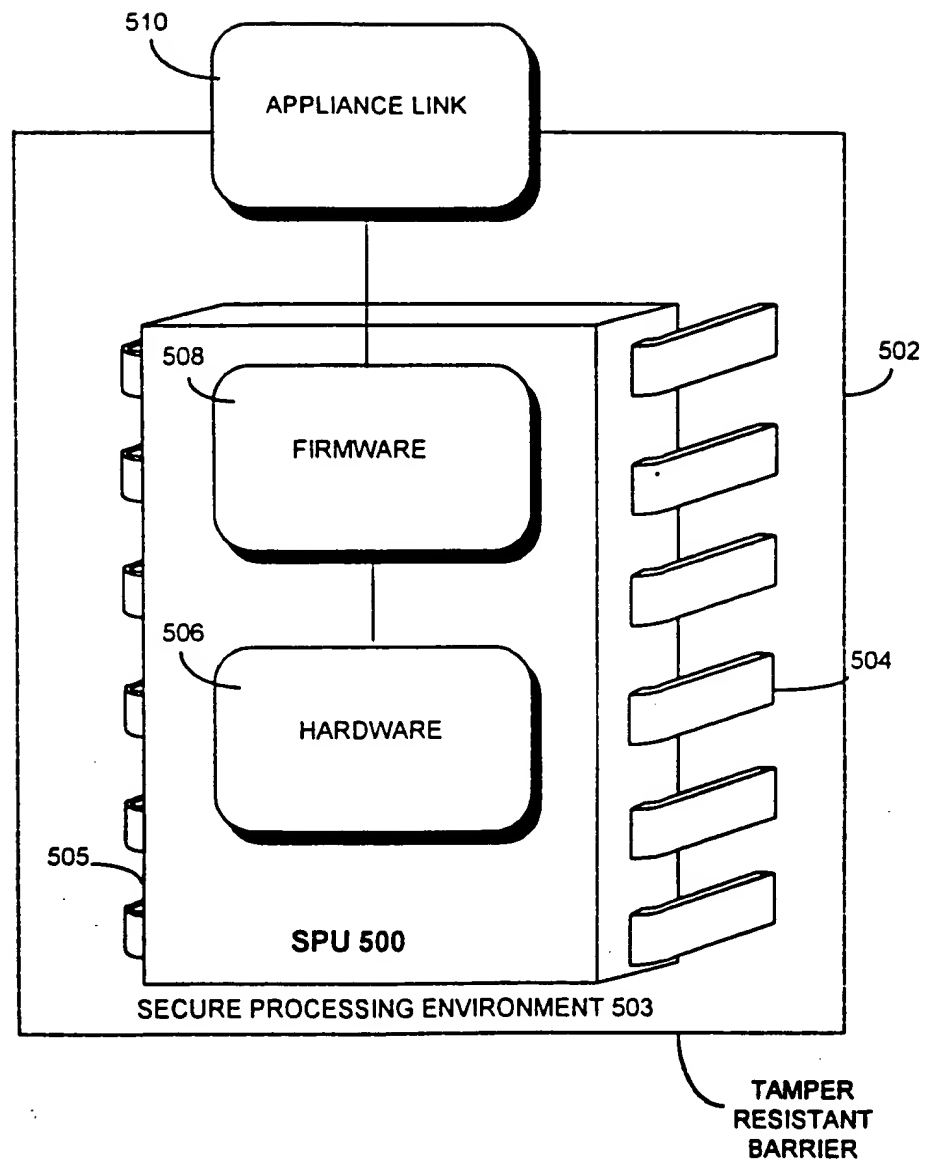
FIG. 8   ELECTRONIC APPLIANCE 600
("VDE NODE")

600

POWER SUPPLY 659

CPU 654

653

CPU 654(M)

612,614

670

RAM 656

KEYBOARD/ DISPLAY

BACKUP STORAGE

ROM 658

660

668

SPU 500

I/O CONTROLLER

COMMUNICATIONS CONTROLLER

666

SPU 500(N)

672

NETWORK

652

SECONDARY STORAGE

APPLICATION PROGRAMS 608

| VDE AWARE 608a | NON-VDE AWARE 608b |

VDE OBJECTS 300

OTHER INFORMATION 673

SECURE DATABASE 610

RIGHTS OPERATING SYSTEM ("ROS") 602

VDE FUNCTIONS 604

OTHER OPERATING SYSTEM FUNCTIONS 606

SYSTEM BUS

FIG. 9

500

502

SPU

532

532A ROM

532B EEPROM/ "FLASH"

534a RAM

534 NVRAM

534b

540 MMU

536

538e

DMA CONTROLLER 526

538d

MICROPROCESSOR 520

538c

BUS INTERFACE UNIT (BIU) 530

652

538b

528

538a

ENCRYPT/ DECRYPT ENGINE 522

COMPRESSION/ DECOMPRESSION ENGINE 546

PATTERN MATCHING ENGINE 524

RANDOM NUMBER GENERATOR 542

ARITHMETIC ACCELERATOR 544

FIG. 10

VDE SOFTWARE ARCHITECTURE

FIG. 11C

VDE - AWARE
APPLICATION
608a(2)

OTHER OS
FUNCTION CALLS

REDIRECTOR
684

USER API
682

VDE AND
OTHER
FUNCTION
CALLS

VDE
FUNCTIONS

OTHER
OS
FUNCTIONS

606

604

500

ROS 602

FIG. 11B

NON - VDE AWARE
APPLICATION
608b

OTHER OS
FUNCTION CALLS

REDIRECTOR
684

VDE
FUNCTION
CALLS

VDE
FUNCTIONS

OTHER
OS
FUNCTIONS

606

604

500

ROS 602

FIG. 11A

VDE - AWARE
APPLICATION
608a(1)

VDE AND OTHER
FUNCTION CALLS

USER API
682

OTHER
OS
FUNCTIONS

606

VDE
FUNCTIONS

604

500

ROS 602

Fig. 11D
METHOD CORE

1000'

691

1100(1)

1100(2)

Fig. 11F
LOAD MODULE

Fig. 11E
LOAD MODULE
WITH DTD

1100(3)

Fig 11G LOAD MODULE

1200(1)

1200(2)

1202(1)

Fig. 11H

DATA STRUCTURES

Fig. 11I

690(k)

691

594

602

Fig. 113

602

691

594

690(j)

FIG. 12

FILE SYSTEM 687

EXTERNAL OBJECT REPOSITORIES ~728

COMMERCIAL DATABASE MANAGER ~730

736

REAL TIME FEED

694

776b

RSI
COMM. MANAGER
NETWORK MANAGER 780
MAIL GATEWAY MANAGER
MAIL FILTER 784a	MAIL FILTER 784b
782
OSI

776a

776

DRIVERS & HW MANAGERS

MEMORY MANAGER 680a	TASK MANAGER 680b	PROGRAM LOADER	I/O MANAGER 680c

KERNEL 680

SERVICE TRANS-PORT LAYER

S	S
V	V
C	C
D	L
V	F
R	C

786   786a   786b   772b 772a

EXTERNAL SERVICES MANAGER 772

OSI

772a

OBJECT SWITCH 734

REAL TIME STREAM INTERFACE 760

INTERFACE

INTERFACE

TIME TIME INTERFACE

TIME TIME INDEPENDENT STREAM INTERFACE 762

ROUTING TABLES

766   692

STEAM INTER-ROUTER CEPT

763

CONTAINER MANAGER

764

768

OBJECT REPOSITORY MANAGER

OSI

770a

770

OBJECT SUBMITTAL MGR 774

OSI 774a

NAME SERVICES 752

NAME SERVICES MANAGER 752

RSI 752b

SECURE DB MGR 744

RSI 744a

DB INTERFACE 744 CACHE MGR. 746

DB DRIVER 748

750

| OUTGOING ADMIN. OBJECTS MANAGER 754 | O | S | I |
| R | S | I |

754a   754b

| INCOMING ADMIN. OBJECTS MANAGER 756 | O | S | I |
| R | S | I |

756a   756b

| GATE WAY 734 | O | S | I |
| R | S | I |

734a   734b

REDIRECTOR 684

RSI 684a

API SERVICE 742

RSI 742a

USER API 682

RPC MANAGER 732

NOTIFICATION SERVICE 740

RSI 740a

USER NOTIFICATION AND EXCEPTION INTERFACE ("POPUP") 686

| HPE DEVICE DRIVER 738 | R | S | I |

738a

655

HPE

| SPE DEVICE DRIVER 736 | R | S | I |

736a

SPE

503

FIG. 12A
OBJECT CREATION

USER INPUT 774(1)

OBJECT DEFINITION 1220

OBJECT CONFIGURATION FILE

1240

USER INPUT 774(2)

OBJECT CONSTRUCTION 1230

"CONTENT"

VDE OBJECT

300

FIG. 13

PROTECTED PROCESSING ENVIRONMENT 650

503, 655

KERNEL/DISPATCHER 552

TASK MANAGER 576

MEMORY MANAGER 578

VIRTUAL MEMORY MANAGER 580

LOW LEVEL SERVICES MANAGER 582

INTERNAL INTERRUPT HANDLER(S) 584

BIU HANDLER 586

SERVICE INTERRUPT QUEUE(S) 588

DTD INTERPRETER 590

RSI 552a

LOAD MODULE EXECUTION MANAGER 568

LM EXECUTOR (PROGRAM LOADER) 570

INTERNAL LMs 572

LIBRARY ROUTINES 574

568a

TO/FROM ROS KERNEL 680

RANDOM NUMBER GENERATOR MANAGER 565 | RSI 565a

AUTH. MANAGER/ SECURE COMMUN MANAGER 564 | RSI 564a

SECURE DB MANAGER 566 | RSI 566a

SUMMARY SERVICES MANAGER 560 | RSI 560a

CHANNEL SERVICES MANAGER 562 | RSI 562a

ENCRYPT/ DECRYPT MANAGER 556 | RSI 556a

KEY & TAG MANAGER 558 | RSI 558a

TIME BASE MANAGER 554 | RSI 554a

RPC MANAGER 550

OTHER SERVICES

R S I 592a

592

DEVICE FIRM WIRE LOW LEVEL SERVICES 582
INITIALIZATION
POST
DOWNLOAD CHALLENGE/RESPONSE AND AUTHENTICATION
RECOVERY
EEPROM/FLASH MEMORY MANAGER

KERNEL/DISPATCHER 552
INITIALIZATION
TASK MANAGER 576 (SLEEP/AWAKE/CONTEXT SWAP)
INTERRUPT HANDLER 584 (TIMER/BIU/POWER FAIL/WATCHDOG TIMER/ENCRYPTION COMPLETED)
BIU HANDLER 586

MEMORY MANAGER 578
INITIALIZATION (SETTING MMU TABLES
ALLOCATE
DELLOCATE

VIRTUAL MEMORY MANAGER 580
SWAP BLOCK PAGING
EXTERNAL MODULE PAGING
MEMORY COMPRESS

RPC AND TABLES 550
INITIALIZATION
MESSAGING CODE /SERVICES MANAGER
SEND/RECEIVE
STATUS
RPC DISPATCH TABLE
RPC SERVICE TABLE

•
•
•

FIG. 14A

TIME BASE MANAGER 554

ENCRYTION/DECRYPTION MANAGER 556
PK
BULK

KEY AND TAG MANAGER 558
KEY STORAGE IN EEPROM
KEY LOCATOR
KEY GENERATOR
CONVOLUTION ALGORITHM

SUMMARY SERVICES MANAGER 560
EVENT SUMMARIES
BUDGET SUMMARIES
DISTRIBUTER SUMMARY SERVICES

CHANNEL SERVICES MANAGER 562
CHANNEL HEADERS
CHANNEL DETAILS

LOAD MODULE EXECUTION SERVICES 568

AUTHENTICATION MANAGER/SECURE COMMUNICATION MANAGER 564

DATABASE MANAGER 566
MANAGEMENT FILE SUPPORT
TRANSACTION AND SEQUENCE NUMBER SUPPORT
SRN/ HASH
DTD INTERPRETER 590

LIBRARY ROUTINES 574
I/O CALLS(STRING SEARCH ETC.)
MISC. ITEMS THAT ARE PROBABLY LIBRARY ROUTINES
TAG CHECKING,MD5,CRC'S

INTERNAL LM'S 572 FOR BASIC METHODS
METER LOAD MODULE(S)
BILLING LOAD MODULE(S)
BUDGET LOAD MODULE(S)
AUDIT LOAD MODULE(S)
READ OBJECT LOAD MODULE(S)
WRITE OBJECT LOAD MODULE(S)
OPEN OBJECT LOAD MODULE(S)
CLOSE OBJECT LOAD MODULE(S)

•
•
•

SPU ROM/EEPROM/FLASH 532

FIG. 14B

```
                            o
                            o
                            o

        PUBLIC KEY AND PRIVATE KEY, SYSTEM ID,
     AUTHENTICATION CERTIFICATE,VDE SYSTEM PUBLIC
                KEY, PRIVATE DES KEY

              TOP LEVEL KEYS FOR OBJECTS

                 TOP LEVEL BUDGET INFO
                 METER SUMMATION VALUES
       KEY RECORDS FOR BUDGET RECORDS, AUDIT
     RECORDS, STATIC MANAGEMENT RECORDS, UPDATED
                MANAGEMENT RECORDS, ETC.
                            o
                            o
                            o
        DEVICE DATA TABLE

            SITE ID

            TIME

            ALARMS

            TRANSACTION/SEQUENCE #'S

            MISCELLANEOUS

        MEMORY MAP

            MAP METERS

            LM/UDT TABLE

        TASK MANAGER 576

            CHANNEL(S)

        SUMMARY SERVICES  560

     SECURE DATABASE TAGS

            SRN ENTRIES

            HASH ENTRIES
                            o
                            o
                            o
        NON-VOLATILE MEMORY 534b
```

FIG. 14C

STACK	
o o	
CHANNEL SWAP BLOCK	CHANNEL LM
	CHANNEL HEADER & D1
CONTROL SWAP BLOCK	CONTROL LM
	CONTROL D1
	COMMIT LM
	COMMIT D1, D2, D3
EVENT SWAP BLOCK	EVENT LM
	MAP TABLE (SINGLE) D1
METER SWAP BLOCK	METER LM
	METER UDE DELTA,DELTA'
	METER TRAIL LM
	METER TRAIL UDE DELTA,DELTA'
BUDGET SWAP BLOCK	METER LM
	METER UDE DELTA,DELTA'
	METER TRAIL LM
	METER TRAIL UDE DELTA,DELTA'
BILLING SWAP BLOCK	BILLING LM
	METER UDE
	BUDGET UDE
	BILLING TABLE UDE
	BILLING TRAIL LM
	BILLING TRAIL UDE DELTA'

o
o

SPU RAM 532

CHANNEL SERVICES MANAGER 562

EVENT ROUTING

CHANNEL 594

CHANNEL HEADER 596

TO ANOTHER CHANNEL

EVENT RETURN

COMPONENT ASSEMBLY 690d

COMPONENT ASSEMBLY 690c

COMPONENT ASSEMBLY 690b

COMPONENT ASSEMBLY 690a

COMPONENT ASSEMBLY 690f

COMPONENT ASSEMBLY 690e

LOAD MODULE EXECUTION MANAGER 569

FIG. 15

FIG. 15A

CHANNEL ID	597(1)
USER ID	597(2)
OBJECT ID	597(3)
RIGHT ID/REF.	597(4)

CHANNEL HEADER 596

EVENT QUEUE	597(5)
EVENT CODE 1/PTR. TO CDR(1)	598(1)
EVENT CODE 2/PTR TO CDR(2)	598(2)
∘ ∘ ∘	
EVENT CODE N/PTR TO CDR(N)	598(N)
JUMP/REFERENCE TABLE	599

CDRI 594(1)

CHANNEL DETAIL RECORD (1)
CONTROL METHOD LOAD MODULE REF.
URT REF
REF TO OTHER DATA STRUCTURE(S)

CDR2 594(2)

CHANNEL DETAIL RECORD (2)
LM(1) REF.
REF. TO DATA STRUCTURE(S)
LM(2) REF
REF. TO DATA STRUCTURE(S)
∘ ∘ ∘
LM(N) REF.
REF. TO DATA STRUCTURE(S)

CDR (N) 594(N)
∘ ∘ ∘

FIG. 15B

OPEN CHANNEL

(OBJECT, USER, RIGHT)

ALLOCATE "AVAILABLE" CHANNEL — 1125

ACCESS "BLUEPRINT" — 1127

WRITE TO CHANNEL HEADER — 1129

OBTAIN CONTROL METHOD — 1131

"BIND" CONTROL METHOD TO CHANNEL — 1133

PASS "INIT" EVENT TO CHANNEL — 1135

ACCESS COMPONENTS — 1137

"BIND" COMPONENTS TO CHANNEL BY CONSTRUCTING CHANNEL DETAIL RECORD(S) FOR EACH EVENT WITHIN "RIGHT" — 1139

END

FIG. 16

SECURE DATABASE 610

OBJECT REGISTRY 450

OBJECT REGISTRATION TABLE 460
SUBJECT TABLE 462
USER RIGHTS TABLE 464
ADMINISTRATIVE EVENT LOG 442
SHIPPING TABLE 444
RECEIVING TABLE 446

→ OBJECT STORAGE 728

PERCS 808

NAME SERVICES RECORDS 452

CONFIGURATION RECORDS 454

SITE 456
USER 458

LOAD MODULES 1100

METHODS 1000

STATIC CORES 1000'a	DYNAMIC CORES 1000'b
STATIC MDEs 1202a	DYNAMIC MDEs 1202b
STATIC UDEs 1200a	DYNAMIC UDEs 1200b

302
800

PUBLIC HEADER   802

PRIVATE HEADER   804

PRIVATE BODY
(METHODS 1000)   806

PERMISSIONS RECORDS   808

KEY BLOCK(S)   810
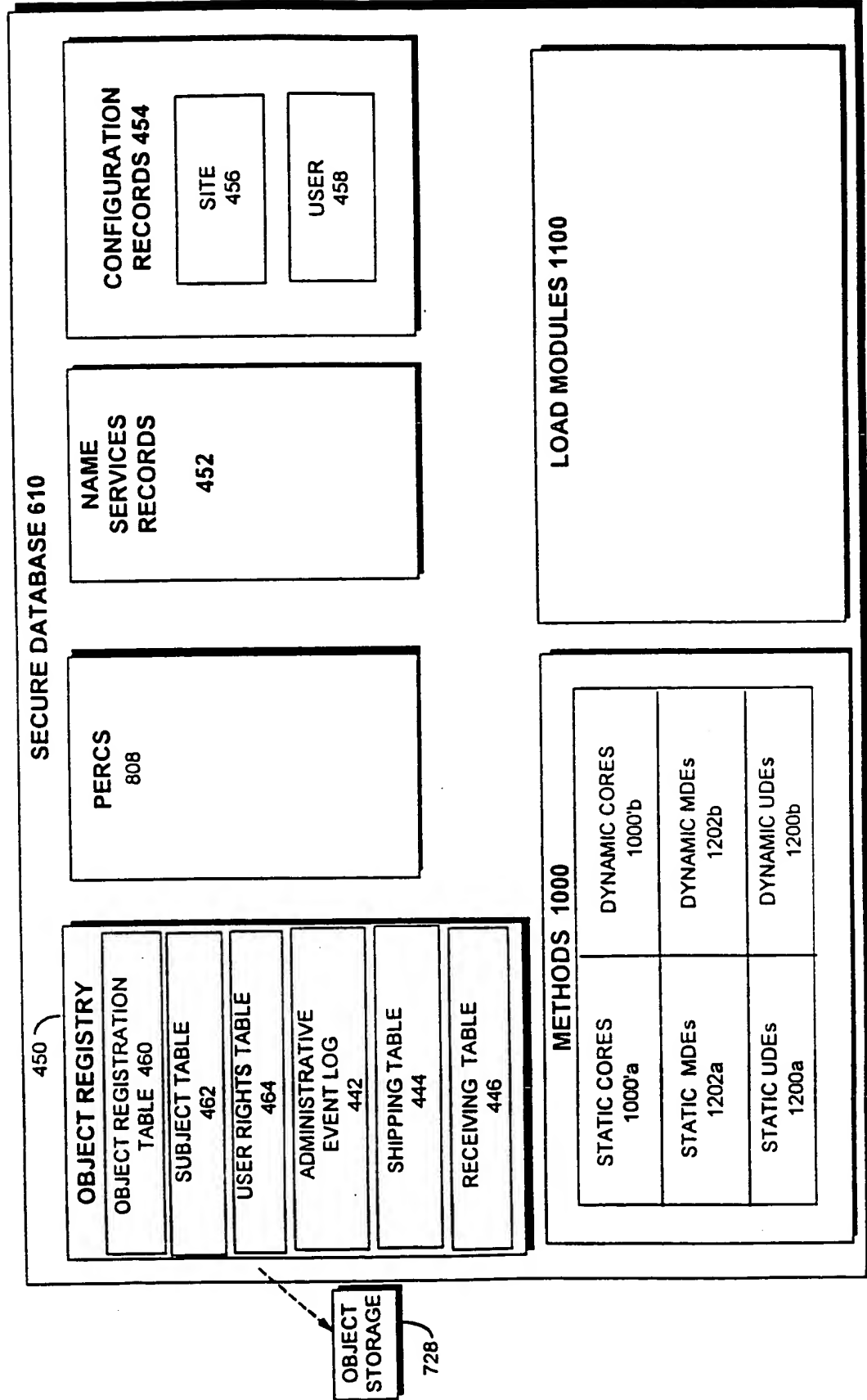
DATA BLOCK   812a

DATA BLOCK   812b

CONTENT

DATA BLOCK   812c

o
o
o

LOGICAL OBJECT

FIG. 17

850

PUBLIC HEADER 802		CLEAR
PRIVATE HEADER 804	COPY OF IDENTIFICATION ELEMENTS FROM PUBLIC HEADER	PRIVATE HEADER KEY (1 OF MANY)
PRIVATE BODY(OBJECT LOCAL METHODS, LOAD MODULES, AND UDEs) 806		PRIVATE BODY KEY (IN PERC)
CONTENT 812a	DATA BLOCK 1	CONTENTS KEY 1 (IN PERC)
	□ □ □	□ □ □
812n	DATA BLOCK n	CONTENTS KEY n (IN PERC)

STATIONARY OBJECT

FIG. 18

860

PUBLIC HEADER 802	CLEAR
PRIVATE HEADER 804	COPY OF IDENTIFICATION ELEMENTS FROM PUBLIC HEADER	PRIVATE HEADER KEY (1 OF MANY)

808 ┐ PERC
KEY BLOCKS 810

PRIVATE BODY(OBJECT METHODS, LOAD MODULES, AND UDEs) 806	PRIVATE BODY KEY (IN PERC)
CONTENT 812a DATA BLOCK 1	CONTENTS KEY 1 (IN PERC)
. . .	. . .
812n DATA BLOCK n	CONTENTS KEY n (IN PERC)

TRAVELING OBJECT

FIG. 19

880

PUBLIC HEADER 802	CLEAR
PRIVATE HEADER 804 / COPY OF IDENTIFICATION ELEMENTS FROM PUBLIC HEADER	PRIVATE HEADER KEY (1 OF MANY)
PRIVATE BODY(OBJECT LOCAL METHODS, LOAD MODULES, AND UDEs) 806	PRIVATE BODY KEY (IN PERC)
CONTENT 812a DATA BLOCK 1	CONTENTS KEY 1 (IN PERC)

CONTENT CONTAINER 300
INFORMATION CONTENT
PERMISSIONS RECORD
BUDGETS
METHODS

EMBEDDED CONTENT OBJECT

ADMINISTRATIVE OBJECT

812b   870

812n   DATA BLOCK n   CONTENTS KEY n (IN PERC)

CONTENT OBJECT

FIG. 20

870

PUBLIC HEADER 802	CLEAR
PRIVATE HEADER 804 / COPY OF IDENTIFICATION ELEMENTS FROM PUBLIC HEADER / 808 / PERC	PRIVATE HEADER KEY (1 OF MANY)
PRIVATE BODY(OBJECT LOCAL METHODS, LOAD MODULES, AND UDEs) 806	PRIVATE BODY KEY (IN PERC)
CONTENT 812	CONTENTS KEY (IN PERC)

CONTENT 812

872a   ADMINISTRATIVE INFORMATION

872b

EVENT 1	PARAMETERS	DATA
EVENT 2	PARAMETERS	DATA
⋮	⋮	⋮
EVENT N	PARAMETERS	DATA

872n

874   876   878

ADMINISTRATIVE OBJECT

FIG. 21

FIG. 22

1000'

PUBLIC HEADER 802				CLEAR TEXT
PRIVATE HEADER 804		COPY OF IDENTIFICATION ELEMENTS FROM PUBLIC HEADER		
EVENT 1 1014	1016	1018a	1018b	• • •
EVENT 2	**METHOD EVENT TABLE**			• • •
EVENT 3				• • •
EVENT 4	PERC/ LM REF.			• • •
EVENT 5		DATA REF 1		• • •
EVENT 6			DATA REF 2	• • •
EVENT 7				• • •
• • •	• • •	• • •	• • •	• • •
EVENT N				• • •

1012(1)
1012(2)
1012(3)
SITE SPECIFIC METHOD KEY
1012(4)
1012(5)
1012(6)
1012(7)
1012(N)

1006

1008

**METHOD LOCAL DATA AREA
(MDEs, UDEs, DTDs OR PORTIONS THEREOF,
OR REFERENCES THERETO)**

SITE SPECIFIC METHOD KEY

METHOD "CORE"

FIG. 23

1100

PUBLIC HEADER 802		CLEAR
PRIVATE HEADER 804	COPY OF IDENTIFICATION ELEMENTS FROM PUBLIC HEADER	SITE SPECIFIC LM KEY
ENCRYPTED EXECUTABLE BODY 1106		SITE SPECIFIC LM KEY
DTD 1 1108(a)		SITE SPECIFIC LM KEY
□ □ □		□ □ □
DTD n 1108(n)		SITE SPECIFIC LM KEY

LOAD MODULE

FIG. 24

1200, 1202

PUBLIC HEADER 802

CLEAR

PRIVATE HEADER
804

COPY OF IDENTIFICATION
ELEMENTS FROM PUBLIC
HEADER

DATA AREA

1206

(MAY REFERENCE ONE OR MORE DTDs)

SITE SPECIFIC
UDE KEY

UDE (MDE)

FIG. 25A

USAGE BIT MAP

ELEMENT REPRESENTING PAST USAGE OF ONE ATOMIC ELEMENT OF OBJECT

1010

1206

FIG. 25B

TIME

	JAN.	FEB.	MAR.	APRIL	MAY	JUNE
1	0	2	0	1	0	0
2	0	0	5	10	3	0
3	0	3	2	1	0	
4	0	0	0	1	0	
5	0	0	1	0		
6	0	0	0			

RECORDING NUMBER

1206

FIG. 25C

USAGE PAID FOR 5 MONTHS AGO
USAGE PAID FOR 4 MONTHS AGO
USAGE PAID FOR 3 MONTHS AGO
USAGE PAID FOR 2 MONTHS AGO
USAGE PAID FOR IN PRIOR MONTH
USAGE PAID FOR IN CURRENT MONTH

1206a
1206b
1206c
1206d
1206e

1206

WIDE BITMAP
METER METHOD   404

BILLING METHOD   406

FIG. 25C

USAGE PAID FOR 5 MONTHS AGO
USAGE PAID FOR 4 MONTHS AGO
USAGE PAID FOR 3 MONTHS AGO
USAGE PAID FOR 2 MONTHS AGO
USAGE PAID FOR IN PRIOR MONTH
USAGE PAID FOR IN CURRENT MONTH

1206a
1206b
1206c
1206d
1206e

1206

WIDE BITMAP
METER METHOD   404

BILLING METHOD   406

FIG. 26

PERMISSIONS RECORD

PERC HEADER		CSØ	PRIVATE BODY KEYS

900   902   808   904

RIGHTS RECORD HEADER 1 908a		CSR 910a	RIGHT KEYS 912a

906a

CONTROL SET HEADER 1 916(a)(1)	CONTROL METHOD 918(a)(1)

920(a)(1)(i)
914a(1)

REQUIRED METHOD HEADER 1 922(a)(1)(i)

924(a)(1)(i)(A) METHOD OPTION	924(a)(1)(i)(B) METHOD OPTION	◦ ◦ ◦

920(a)(1)(ii)

REQUIRED METHOD HEADER 2 922(a)(1)(ii)

924(a)(1)(ii)(A) METHOD OPTION	924(a)(1)(ii)(B) METHOD OPTION	◦ ◦ ◦

◦ ◦ ◦

CONTROL SET HEADER 2 916(a)(2)	CONTROL METHOD 918(a)(2)

920(a)(2)(i)
914(a)(2)

REQUIRED METHOD HEADER 1 922(a)(2)(i)

924(a)(2)(i)(A) METHOD OPTION	924(a)(2)(i)(B) METHOD OPTION	◦ ◦ ◦

REQUIRED METHOD HEADER 2 922(a)(1)(ii)

920(a)(2)(ii)

924(a)(2)(ii)(A) METHOD OPTION	924(a)(2)(ii)(B) METHOD OPTION	◦ ◦ ◦

◦ ◦ ◦

RIGHTS RECORD HEADER 2 908b		CSR 910b	RIGHT KEYS 912b

906b

914(b)(1)

916(b)(1) CONTROL SET HEADER 1	916(b)(2) CONTROL METHOD

◦ ◦ ◦

◦ ◦ ◦

FIG. 26A

808

HEADER 900

926	SITE RECORD NUMBER	
928	LENGTH OF PRIVATE BODY KEY BLOCK	
930	LENGTH OF THIS RECORD	
	EXPIRATION DATE/TIME FOR THIS RECORD	932
	LAST MODIFICATION DATE/TIME	934
	ORIGINAL DISTRIBUTOR ID	936
	LAST DISTRIBUTOR ID	938
940	OBJECT ID	
942	CLASS OR TYPE OF PERMISSIONS RECORD/INSTANCE ID FOR RECORD CLASS	
	NUMBER OF RIGHTS RECORDS	944
	VALIDATION TAG FOR THE RECORD	948

KEY BLOCKS FOR THE PRIVATE BODY(e.g., METHODS) IN OBJECT	950

CONTROL SET RECORD 0 - COMMON TO ALL RIGHTS	
LENGTH OF THIS RECORD	952
NUMBER OF REQUIRED METHOD RECORDS	954
ACCESS TAG TO CONTROL MODIFICATION OF THIS RECORD	956

914(o)

REQUIRED METHOD RECORD 1	
LENGTH OF THIS RECORD	958
NUMBER OF METHOD OPTION RECORDS	960
ACCESS TAG TO CONTROL MODIFICATION OF THIS RECORD	962

924(o)(a)

METHOD OPTION RECORD 1	
LENGTH OF THIS RECORD	964
LENGTH OF DATA AREA	966
METHOD ID (TYPE/OWNER/CLASS/INSTANCE)	968
CORRELATION TAG FOR CORRELATION WITH REQUIRED METHOD	970
ACCESS TAG TO CONTROL MODIFICATION OF THIS RECORD	972
METHOD SPECIFIC ATTRIBUTES	974
DATA AREA	976
CHECK VALUE	978

924(o)(a)(1)

924(o)(a)(2)	METHOD OPTION RECORD 2

920(o)(b)	REQUIRED METHOD RECORD 2

CHECK VALUE

903a	RIGHTS RECORD 1
903b	RIGHTS RECORD 2

CHECK VALUE	980

PERC

FIG. 26B

PERC RIGHTS RECORD

FIG. 27
SHIPPING TABLE

444A(1)

444

SITE RECORD NUMBER	
USER (GROUP) ID	444A(2)
REF. TO "FIRST" COMPLETED OUTGOING SHIPPING RECORD	444A(3)
REF. TO "LAST" COMPLETED OUTGOING SHIPPING RECORD	444A(4)
REF. TO "FIRST" SCHEDULED OUTGOING SHIPPING RECORD	444A(5)
REF. TO "LAST" SCHEDULED OUTGOING SHIPPING RECORD	444A(6)
VALIDATION TAG FROM NAME SERVICES RECORD	444A(7)
VALIDATION TAG FOR "FIRST" OUTGOING SHIPPING RECORD(S)	444A(8)
CHECK VALUE	444A(9)

HEADER 444A

SITE RECORD NUMBER	445(1)(A)
FIRST DATE/TIME FOR SCHEDULED SHIPMENT	445(1)(B)
LAST DATE/TIME FOR SCHEDULED SHIPMENT	445(1)(C)
ACTUAL DATE/TIME OF COMPLETED SHIPMENT	445(1)(D)
OBJECT ID OF ADMINISTRATIVE OBJECT (TO BE) SHIPPED	445(1)(E)
REF. TO ENTRY IN ADMINISTRATIVE EVENT LOG	445(1)(F)
REF. TO NAME SERVICES RECORD NAMING RECIPIENT	445(1)(G)
PURPOSE OF SHIPMENT	445(1)(H)
STATUS OF SHIPMENT	445(1)(I)
REF. TO "PREVIOUS" OUTGOING SHIPPING RECORD	445(1)(J)
REF. TO "NEXT" OUTGOING SHIPPING RECORD	445(1)(K)
VALIDATION TAG FROM HEADER	445(1)(L)
VALIDATION TAG TO ADMINISTRATIVE EVENT LOG	445(1)(M)
VALIDATION TAG TO NAME SERVICES RECORD	445(1)(N)
VALIDATION TAG FROM PREVIOUS RECORD	445(1)(O)
VALIDATION TAG TO NEXT RECORD	445(1)(P)
CHECK VALUE	445(1)(Q)

SHIPPING RECORD 445(1)

o o o	
SHIPPING RECORD N	445(1)(R)

FIG. 28
RECEIVING TABLE

446A(1)

446

SITE RECORD NUMBER	
USER (GROUP) ID	446A(2)
REF. TO "FIRST" COMPLETED INCOMING RECEIVING RECORD	446A(3)
REF. TO "LAST" COMPLETED INCOMING RECEIVING RECORD	446A(4)
REF. TO "FIRST" SCHEDULED INCOMING RECEIVING RECORD	446A(5)
REF. TO "LAST" SCHEDULED INCOMING RECEIVING RECORD	446A(6)
VALIDATION TAG FROM NAME SERVICES RECORD	446A(7)
VALIDATION TAG FOR "FIRST" INCOMING RECEIVING RECORD(S)	446A(8)
CHECK VALUE	446A(9)

HEADER 446A

SITE RECORD NUMBER	447(1)(A)
FIRST DATE/TIME FOR SCHEDULED RECEPTION	447(1)(B)
LAST DATE/TIME FOR SCHEDULED RECEPTION	447(1)(C)
ACTUAL DATE/TIME OF COMPLETED RECEPTION	447(1)(D)
OBJECT ID OF ADMINISTRATIVE OBJECT (TO BE) RECEIVED	447(1)(E)
REF. TO ENTRY IN ADMINISTRATIVE EVENT LOG	447(1)(F)
REF. TO NAME SERVICES RECORD NAMING SENDER	447(1)(G)
PURPOSE OF RECEPTION	447(1)(H)
STATUS OF RECEPTION	447(1)(I)
REF. TO "PREVIOUS" INCOMING RECEIVING RECORD	447(1)(J)
REF. TO "NEXT" INCOMING RECEIVING RECORD	447(1)(K)
VALIDATION TAGS	447(1)(L)
CHECK VALUE	447(1)(M)
○ ○ ○	
RECEIVING RECORD N	447(2)

RECEIVING RECORD 447(1)

FIG. 29
ADMINISTRATIVE EVENT LOG

442

ADMINISTRATIVE EVENT LOG RECORD 1	442(1)
ADMINISTRATIVE EVENT LOG RECORD 2	442(2)
o o o	
SITE RECORD NUMBER	443A(1)
RECORD LENGTH	443A(2)
ID OF ADMINISTRATIVE OBJECT	443A(3)
NUMBER OF EVENTS	443A(4)
VALIDATION TAG FROM SHIPPING OR RECEIVING TABLE	443A(5)
CHECK VALUE	443A(6)
SUBRECORD LENGTH	442(J)(1)(a)
DATA AREA LENGTH	442(J)(1)(b)
EVENT ID	442(J)(1)(c)
RECORD TYPE	442(J)(1)(d)
RECORD ID	442(J)(1)(e)
DATA AREA	442(J)(1)(f)
CHECK VALUE	442(J)(1)(g)
o o o	
SUBRECORD N	442(J)(N)
o o o	
ADMINISTRATIVE EVENT LOG RECORD N	442(N)

HEADER 443A

ADMIN. EVENT LOG RECORD 442(J)

SUBRECORD 442(J)(1)

FIG. 30

METHODS 1000

| METER 1 |
| EVENT 2 |
| EVENT 1 |
| AUDIT 2 |
| BILLING 1 |
| AUDIT 1 |
| METER 2 |
| BUDGET 1 |
| BUDGET 2 |
| BILLING 2 |

USER RIGHTS TABLE (USER, OBJECT) 464

URT RECORD 1	464(1)
URT RECORD 2	464(2)
URT RECORD K	464(K)

PERCs 808 (OBJECT)

| PERC 1 | 808(I) |
| PERC L | 808(L) |

SUBJECT TABLE (USER, OBJECT) 462

| SUBJECT RECORD 1 | 462(1) |
| SUBJECT RECORD J | 462(M) |

OBJECT REGISTRATION TABLE (OBJECT) 460

| OBJECT REGISTRATION RECORD 1 | 460(1) |
| OBJECT REGISTRATION RECORD 2 | 460(2) |

OBJECT REPOSITORY

| OBJ 1 | 300(1) |
| OBJ 2 | 300(2) |

728

460

466(1) — SITE RECORD NUMBER

466(2) — OBJECT TYPE

466(3) — CREATOR ID

466(4) — OBJECT ID

TO OBJECT ←

POINTER INTO SUBJECT TABLE 462

466(5)

TO SUBJECT TABLE RECORD(S) →

460(N)

466(6) — ATTRIBUTE(S)

466(7) — MINIMUM REGISTRATION INTERVAL

466(8) — TAG TO SUBJECT TABLE RECORD

466(9) — CHECK VALUE

FIG. 31
OBJECT REGISTRATION TABLE

FIG. 32

SUBJECT TABLE

462

SITE RECORD NUMBER	468(1)
CREATOR ID	468(2)
ORIGINAL DISTRIBUTOR ID	468(3)
LAST DISTRIBUTOR ID	468(4)
OBJECT ID	468(5)
REF. TO "FIRST" SUBJECT RECORD 470	468(6)
TAG FROM OBJECT REGISTRATION TABLE RECORD	468(7)
TAG TO "FIRST" SUBJECT RECORD	468(8)
CHECK VALUE	468(9)

"HEADER" 468

462(M)

SITE RECORD NUMBER	472(1)
USER (USER GROUP) ID	472(2)
USER (USER GROUP) ATTRIBUTES	472(3)
REF. INTO USER RIGHTS TABLE	472(4)
REF. TO "NEXT" SUBJECT RECORD	472(5)
TAG FROM HEADER	472(6)
TAG TO USER RIGHTS TABLE RECORD	472(7)
TAG TO "NEXT" SUBJECT RECORD	472(8)
CHECK VALUE	472(9)

SUBJECT RECORD 470(1)

TO URT RECORD(S)

FIG. 33 USER RIGHTS TABLE

			464
FROM SUBJECT TABLE	**URT HEADER**	SITE RECORD NUMBER	474(1)
		NUMBER OF RIGHTS RECORDS	474(2)
		REF. TO "FIRST" RIGHT RECORD	474(3)
474		TAG FROM SUBJECT TABLE	474(4)
		TAG TO RIGHTS RECORD	474(5)
		CHECK VALUE	474(6)

464(K)

		476(1)
RIGHTS RECORD HEADER	SITE RECORD NUMBER FOR THIS RIGHTS RECORD	
	RIGHT ID	476(2)
	POINTER TO "NEXT" RIGHTS RECORD	476(3)
	POINTER TO "FIRST" SET OF USER CHOICE RECORDS	476(4)
476	TAG FROM URT HEADER	476(5)
	TAG TO "FIRST" SET OF USER CHOICE RECORDS	476(6)
476(7)	CHECK VALUE	

		478(1)
SET OF USER CHOICE RECORDS	SITE RECORD NUMBER FOR THIS USER CHOICE RECORD	
	USER(USER GROUP) ID	478(2)
	ATTRIBUTES	478(3)
	REF. TO "NEXT" SET OF USER CHOICE RECORDS	478(4)
478	NUMBER OF USER CHOICES	478(5)
	TAG FROM RIGHTS RECORD HEADER	478(6)
	USER CHOICE RECORD 1	480(1)
	USER CHOICE RECORD 2	480(2)
	USER CHOICE RECORD N	480(N)
	CHECK VALUE	

FIG. 34A

SITE RECORD

482

482(J)

TYPE OF RECORD	484(1)
OWNER OR CREATOR OF RECORD	484(2)
CLASS	484(3)
INSTANCE	484(4)
TYPE SPECIFIC DESCRIPTOR (e.g., OBJECT ID) ASSOCIATED WITH RECORD	484(5)
TABLE IN WHICH THE RECORD IS LOCATED	484(6)
POINTER - OFFSET, WITHIN THE TABLE, TO WHERE THE RECORD BEGINS	484(7)
RECORD LENGTH	484(8)
VALIDATION TAG FOR RECORD	484(9)
CHECK VALUE	484(10)

FIG. 34

482 SITE RECORD TABLE

SITE RECORD 0
SITE RECORD 1
SITE RECORD 2
SITE RECORD 3
SITE RECORD 4
SITE RECORD 5
SITE RECORD 6
SITE RECORD 7
SITE RECORD 8
SITE RECORD 9
SITE RECORD 10
SITE RECORD 11
SITE RECORD 12
∘∘∘

460
OBJECT
REGISTRATION
TABLE

∘∘∘

462
SUBJECT
TABLE

∘∘∘

464
USER
RIGHTS
TABLE

∘∘∘

808
PERMISSION REC
PERMISSION REC
∘∘∘

GROUP RECORD 1
GROUP RECORD 2
∘∘∘
GROUP RECORD N

486

GROUP RECORD
TABLE

METHODS 1000
∘∘∘
METER 1
METER 2
∘∘∘
EVENT 1
EVENT 2
∘∘∘
BILLING 1
AUDIT 1
AUDIT 2
∘∘∘
BUDGET 1
BUDGET 2
BILLING 2

FIG. 34B

GROUP RECORD

486

486(J)

SITE RECORD NUMBER	488(1)
NUMBER OF REFERENCE SUBRECORDS	488(2)
VALIDATION TAG FOR GROUP OF RECORDS	488(3)
REFERENCE SUBRECORD 1	488(4)
REF.(SITE RECORD NUMBER 1) FOR 1ST RECORD IN GROUP	490(A)
VALIDATION TAG FOR RECORD	490(B)
REFERENCE SUBRECORD 2	488(5)
REF.(SITE RECORD NUMBER 2) FOR 1ST RECORD IN GROUP	490(C)
VALIDATION TAG FOR RECORD	490(D)
o o o	
CHECKSUM (CRC)	488(6)

FIG. 35

1150

START

1152 APPLIANCE CALLS CLEARINGHOUSE

1154 APPLIANCE AND CLEARINGHOUSE AUTHENTICATE ONE
       ANOTHER AND AGREE ON A MESSAGE KEY

DOES APPLIANCE HAVE
AUDIT INFO TO SEND?

1156

NO

YES

1158 APPLIANCE SENDS ADMINISTRATIVE OBJECT(S)
       CONTAINING AUDIT INFO

1160 CLEARINGHOUSE SENDS RESPONSIVE ADMIN. OBJECT(S)

1162 APPLIANCE UPDATES SECURE DATABASE
       BASED ON OBJECTS RECEIVED

DOES
APPLIANCE HAVE
1163 REQUESTS TO SEND   N
       ?

Y

1164 APPLIANCE SENDS ADMINISTRATIVE OBJECT(S)
       REQUESTING BUDGETS AND/OR PERMISSIONS

1166 CLEARINGHOUSE SENDS RESPONSIVE
       ADMINISTRATIVE OBJECT(S)

1168 APPLIANCE UPDATES SECURE DATABASE BASED
       ON OBJECTS RECEIVED

END

FIG. 36

INSERT ITEM
INTO SECURE
DATABASE

1080

ENCRYPT

ENCRYPTED
DATA

1082

TAG AND
ENCRYPTED
WRAPPER

1084

TAG
STORE

MGT. FILE KEY
AND DATA

PLAINTEXT
CHECKED

1076

DECRYPT

PLAINTEXT

CHECK ELEMENT
INTEGRITY BY
CHECK VALUE
AND DIGITAL
SIGNATURE
TESTS

1078

ADMIN. OBJECT
KEY AND DATA

USER
APPROVED

1070

1074

AUTHORIZATION
SERVICE

RESPONSE

CHECK
USER
AUTHORIZATION
TO
INSERT ITEMS
INTO DATABASE

1072

TICKET AND
REQUEST TYPE

PROVIDE
ITEM TO
BE
INSERTED
INTO SECURE
DATABASE

FIG. 37

1050

INSERT ITEM INTO
SECURE DATABASE

ENCRYPT — 1060

ENCRYPTED
DATA

1062 — TAG AND ENCRYPT ELEMENT

MGT. FILE KEY
AND DATA

TAG STORE — 1064

IF ELEMENT HAS CHANGED

1058 — PROCESS USE RECORD

TAG STORE — 1056

INTERNAL TAG

CHECK CHECK VALUE HEADER, AND SUBSTITUTION TAG — 1054

PLAINTEXT

DECRYPT — 1053

PLAINTEXT

UNWRAP ELEMENT — 1052

MANAGEMENT FILE KEY AND ENCRYPTION DATA

READ ITEM FROM SECURE DATABASE

CORRELATION AND ACCESS KEYS

FIG. 38

```
        ╭──────────────────────╮
        │   STORE ITEM IN      │
        │  SECURE DATABASE     │
        ╰──────────┬───────────╯
                   │
                   ▼
        ┌──────────────────────┐    1086
        │  GENERATE NEW KEY    │
        └──────────┬───────────┘
                   │
                   ▼
        ┌──────────────────────┐    1088
        │  ENCRYPT  RECORD     │
        │  WITH NEW KEY        │
        └──────────┬───────────┘
                   │
                   ▼
              ◇ 1090
          ╱         ╲        YES
        ╱   ROOM      ╲ ──────────────┐
        ╲  FOR NEW    ╱                │
          ╲  KEY?   ╱                  │
              ╲   ╱                    │
               │ NO                    │
               ▼                       │
        ┌──────────────────────┐  1092 │
        │ READ AND DECRYPT     │       │
        │ OTHER RECORD(S)      │       │
        │ FROM SECURE          │       │
        │ DATABASE             │       │
        │ USING OLD KEY(S)     │       │
        └──────────┬───────────┘       │
                   │                   │
                   ▼                   │
        ┌──────────────────────┐  1094 │
        │ RE-ENCRYPT SAID      │       │
        │ OTHER RECORD(S)      │       │
        │ USING NEW KEY        │       │
        └──────────┬───────────┘       │
                   │                   │
                   ▼                   │
        ┌──────────────────────┐  1096 │
        │ DISCARD OLD KEY(S)   │       │
        └──────────┬───────────┘       │
                   │◄──────────────────┘
                   ▼
        ┌──────────────────────┐  1097
        │   SAVE NEW KEY       │
        └──────────┬───────────┘
                   │
                   ▼
        ┌──────────────────────┐  1098
        │ STORE ENCRYPTED      │
        │ RECORD(S)            │
        │ IN SECURE DATABASE   │
        └──────────┬───────────┘
                   │
                   ▼
        ╭──────────────────────╮
        │        END           │
        ╰──────────────────────╯
```

FIG. 39
BACKUP

1250

```
                    ┌──────────────┐
                    │   BACKUP     │
                    └──────┬───────┘
                           │
1252                       ▼
              ┌────────────────────────┐
              │      GENERATE          │
              │    BACKUP KEY(S)       │
              └───────────┬────────────┘
                          │              ◄──────────────┐
1254                      ▼                             │
              ┌────────────────────────┐                │
              │   READ AND DECRYPT     │                │
              │       ITEM             │                │
              └───────────┬────────────┘                │
                          │                             │
1256                      ▼                             │
              ┌────────────────────────┐                │
              │  ENCRYPT ITEM WITH     │                │
              │    BACKUP KEY(S)       │                │
              └───────────┬────────────┘                │
                          │                             │
1258                      ▼                             │
              ┌────────────────────────┐                │
              │   WRITE ENCRYPTED      │                │
              │   ITEM TO BACKUP       │                │
              │       STORE            │                │
              └───────────┬────────────┘                │
                          │                             │
1260                      ▼            YES              │
                    ◇─────────────◇───────────────────┘
                    │   MORE?     │
                    ◇─────────────◇
                          │ NO
1262                      ▼
              ┌────────────────────────┐
              │   ENCRYPT SUMMARY      │
              │  SERVICES AUDIT INFO.  │
              │  WITH BACKUP KEY(S),   │
              │       WRITE TO         │
              │     BACKUP STORE       │
              └───────────┬────────────┘
                          │
1264                      ▼
              ┌────────────────────────┐
              │   ENCRYPT BACKUP       │
              │  KEY(S) AND OTHER ID   │
              │        INFO.           │
              │   WITH PUBLIC KEY;     │
              │       WRITE TO         │
              │     BACKUP STORE       │
              └───────────┬────────────┘
                          │
1266                      ▼
              ┌────────────────────────┐
              │   ENCRYPT BACKUP       │
              │  KEY(S) WITH ADMIN.    │
              │   KEY; WRITE TO        │
              │     BACKUP STORE       │
              └───────────┬────────────┘
                          │
                          ▼
                    ┌──────────────┐
                    │    DONE      │
                    └──────────────┘
```

FIG. 40

RECOVER SECURE DATABASE

1268

START

ESTABLISH
SECURE
COMMUNICATIONS
1270

EXTRACT
"WORK IN PROGRESS"
AND SUMMARY VALUES
1272

REQUEST CURRENT
BACKUP FROM SPU
1274

RESET SUMMARY
VALUES AND COUNTERS
CONSISTENT WITH LAST
BACKUP
1276

RESTORE SECURE DB
FROM BACKUP
1278

COMPUTE BILLS BASED
ON RECOVERED
VALUES
1280

PERFORM OTHER
ACTIONS TO RECOVER
FROM SPU DOWNTIME
1282

END

600B

VDE Node

1000B

METHOD

Response-1

1454

1452

Event and optional information

600A

VDE Node

1000A

METHOD

Request-1

1450

Figure 41a

600B

VDE Node   1454

METHOD
1000B

Response-1

Request-4

1468

1452

Event and optional information

1469

Event and optional information

600A

VDE Node   1450

METHOD
1000A

Request-1

Response-4

1470

Figure 41b

600C

VDE node

1460

METHOD	
	Response-2
	Request-3

1000C

1462

1464 · · · Event and optional information

Event and optional information

1458

600B

VDE node

1454   1456   1466

METHOD	
	Response-3
	Request-2
	Response-1
	Request-4

1000B

1468

1469 · · · Event and optional information

Event and optional information

1452

Event and optional information

600A

VDE node

1450

METHOD	
	Request-1
	Response-4

1000A

1470

Figure 41c

Figure 41d

2250

BUDGET
Method Use
Process Flo\

Figure 42a

2250

BUDGET Method Administrative Request Process Flow

```
Start BUDGET Method
Administrative Request
     Process
```

[2280]

```
   Prime  BUDGET
Administrative Audit
       Trail
```
— Write →
[2282]
```
     BUDGET
  Administrative
   Audit Trail
```

[2284]
```
Queue Request for
 Administrative
 Processing of
    BUDGET
```
— Write →
[2286]
```
     BUDGET
  Administrative
     Request
```

[2288]
```
  Save BUDGET
Administrative Audit
       Trail
```
— Write —→
[2290]
```
     BUDGET
  Administrative
   Audit Trail
```

Some time later

[2292]
```
     Prime
communications audit
       trail
```
— Write —→
[2294]
```
 Communications
   audit trail
```

[2296]
```
  Write  BUDGET
 Administrative
 Request into
 Administrative
    Object
```
← Read —
[2298]
```
  BUDGET UDE,
 BUDGET Audit
Trail UDE(s), and
    BUDGET
 Administrative
    Request
   Record(s)
```

[2304]
```
End BUDGET Method
Administration Request
      Process
```

[2300]
```
Save communications
    audit trail
```
— Write —→
[2302]
```
 Communications
   audit trail
```

Figure 42b

2250

BUDGET Method Administrative Response Process Flow

[2306]

(Start BUDGET Method Administrative Response Process)

↓

Prime BUDGET Communications and Response Audit Trail

—Write→

[2308]

Communications and Response Audit Trail

↓

[2310]

Unpack Admin. Object and retrieve BUDGET request(s), audit trail(s) and record(s)

—Write→

[2312]

BUDGET Administrative Request, Budget records, and audit information

↓

[2314]

Retrieve request and determine the response method to run to process the request

←Read—

[2316]

Administrative Request

↓

[2318]

Send event(s) contained in Request record(s) to the Response Method and generate Response records and Response request

—Read/Write→

[2320]

BUDGET Request and Response records

↓

[2322]

Write BUDGET Administrative Response records into Administrative Object

←Read—

[2324]

BUDGET UDE and BUDGET Administrative Response Records

[2330]

(End BUDGET Method Administration Response Process)

↓

[2326]

Save communications and response processing audit trail

—Write→

[2328]

Communications and response processing audit trail

Figure 42c

2250

BUDGET Method Administrative Reply Process Flow

Start BUDGET Method Administrative Reply Process

Prime BUDGET Administrative and Communications Audit Trail [2332] —Write→ BUDGET Administrative and Communications Audit Trail [2334]

Extract Response Records and Requests from Administrative Object and write Reply records to the secure database [2336] —Write→ BUDGET Reply Records and Requests [2338]

Save BUDGET Administrative and Communications Audit Trail [2340] —Write→ BUDGET Administrative and Communications Audit Trail [2341]

Some time later

Prime audit trail (if required) [2342] —Write→ Audit Trail UDE [2343]

Retrieve Reply record and determine method required to process it [2344] ←Read— BUDGET Reply records [2346]

Send event(s) contained in Reply record(s) to the Reply method and generate / update database records [2348] —Read/Write→ BUDGET records [2350]

Delete Reply record(s) from database [2352] —Delete→ BUDGET Reply Record(s) [2353]

Audit Trail UDE [2355]

Write

Prime audit trail (if required) [2354]

End BUDGET Method Administration Reply Process [2356]

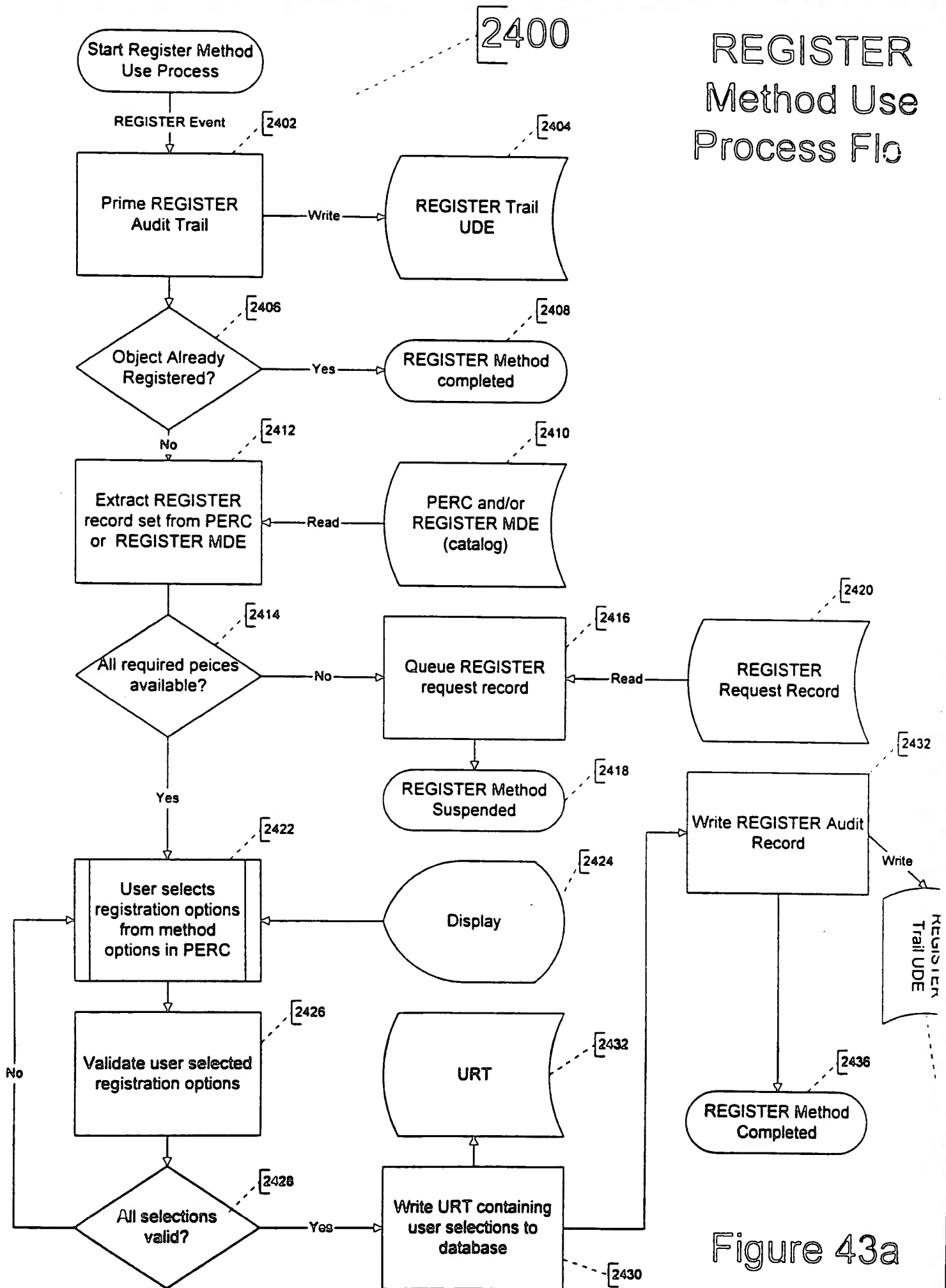Figure 42d

REGISTER
Method Use
Process Flo
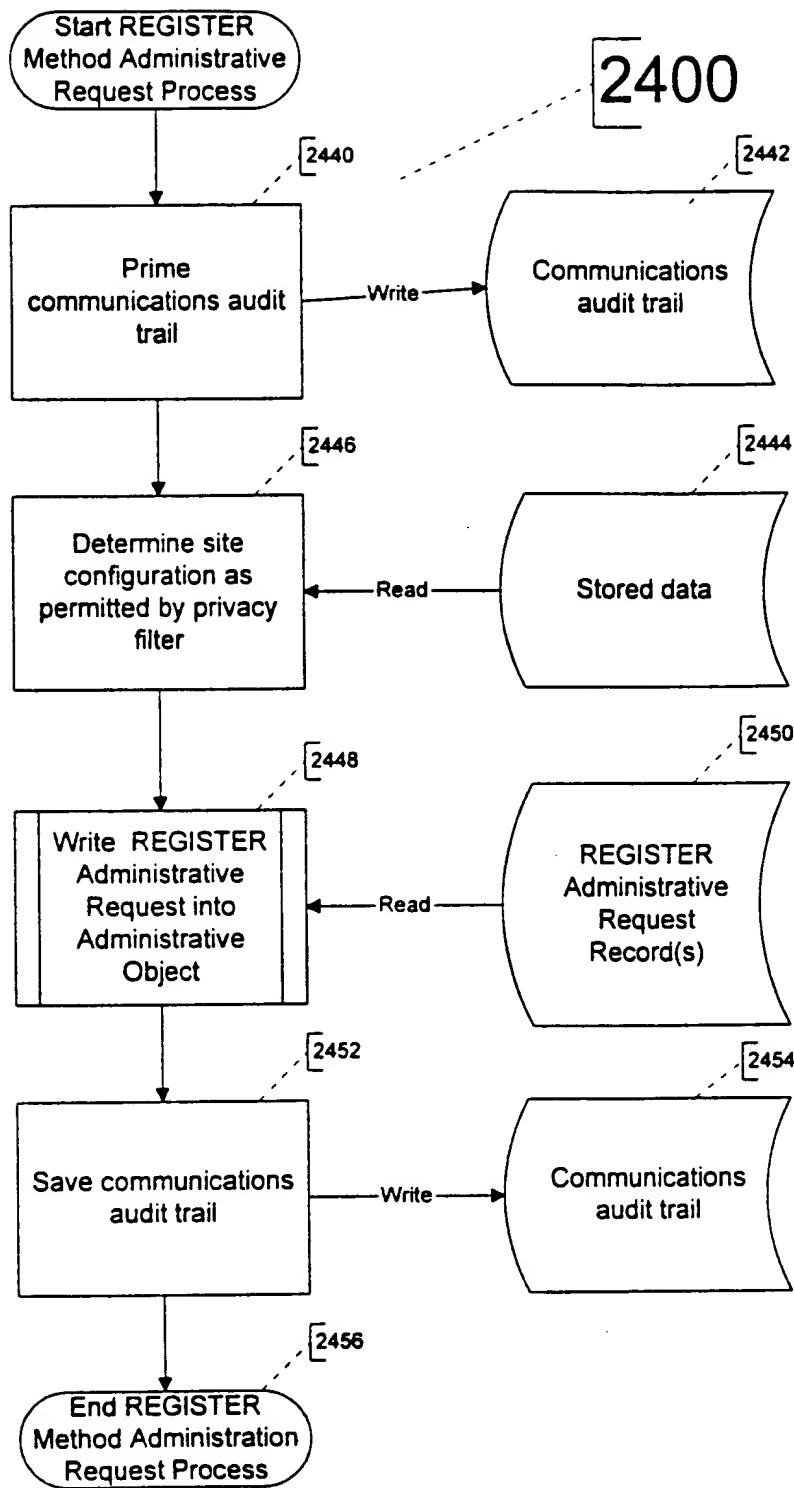
2400

Figure 43a

Start Register Method Use Process

REGISTER Event ⎡2402

Prime REGISTER Audit Trail —Write→ **REGISTER Trail UDE** ⎡2404

⎡2406 **Object Already Registered?** —Yes→ **REGISTER Method completed** ⎡2408

No ⎡2412

Extract REGISTER record set from PERC or REGISTER MDE ←Read— **PERC and/or REGISTER MDE (catalog)** ⎡2410

⎡2414 **All required peices available?** —No→ **Queue REGISTER request record** ⎡2416 ←Read— **REGISTER Request Record** ⎡2420

REGISTER Method Suspended ⎡2418

Yes

⎡2422 **User selects registration options from method options in PERC** ←— **Display** ⎡2424

Write REGISTER Audit Record ⎡2432 —Write→ REGISTER Trail UDE

⎡2426 **Validate user selected registration options**

URT ⎡2432

REGISTER Method Completed ⎡2436

No

⎡2428 **All selections valid?** —Yes→ **Write URT containing user selections to database** ⎡2430

Start REGISTER
Method Administrative
Request Process

2440

Prime
communications audit
trail

Write → 2442

Communications
audit trail

2446

Determine site
configuration as
permitted by privacy
filter

← Read — 2444

Stored data

2448

Write REGISTER
Administrative
Request into
Administrative
Object

← Read — 2450

REGISTER
Administrative
Request
Record(s)

2452

Save communications
audit trail

Write → 2454

Communications
audit trail

2456

End REGISTER
Method Administration
Request Process

2400

Figure 43b

REGISTER
Method
Administrative
Response
Process Flow

Start REGISTER
Method Administrative
Response Process

Prime REGISTER
Communications and
Response Audit Trail
—Write—▷
Communications
and Response
Audit Trail
[2460] [2462]

Unpack Admin.
Object and retrieve
REGISTER
request(s)
—Write—▷
REGISTER
Administrative
Requests and
configuration
information
[2464] [2466]

Retrieve request and
determine the
response method to
run to process the
request
◁—Read—
Administrative
Request
[2468] [2470]

User provided
enough information
to register the
object?
—No—▷
Write failure response
record to database
[2472] [2474]

Send event(s)
contained in
Request record(s)
to the Response
Method and
generate
Response records
and Response
request
◁—Read/Write—▷
REGISTER
Request and
Response records
(response records,
PERC, UDE(s))
[2476] [2478]

Write REGISTER
Administrative
Response records
into Administrative
Object
◁—Read—
PERC, UDE(s),
Methods and
REGISTER
Administrative
Response
Records
[2480] [2482]

End REGISTER
Method Administration
Response Process
[2488]

Save communications
and response
processing audit trail
—Write—▷
Communications
and response
processing audit
trail
[2484] [2486]

Figure 43c

Start REGISTER Method Administrative Reply Process

Prime REGISTER Administrative and Communications Audit Trail | 2490
Write → REGISTER Administrative and Communications Audit Trail | 2492

Extract Response Records and Requests from Administrative Object and write Reply records to the secure database | 2494
Write → REGISTER Reply Records and Requests | 2496

Save REGISTER Administrative and Communications Audit Trail | 2498
Write → REGISTER Administrative and Communications Audit Trail | 2500

Some time later

Prime Audit Trail (if required) | 2501
Write → Audit trail records | 2502

Retrieve Reply record and determine method required to process it | 2503
← Read — REGISTER Reply records | 2504

Send event(s) contained in Reply record(s) to the Reply method and generate / update database records | 2506
Read/Write → REGISTER secure database records (Methods, Load Modules, MDE, UDE) | 2508

Delete Reply record(s) from database | 2510
Delete → REGISTER Reply Record(s) | 2511

Audit trail records | 2513
↑ Write

Write Audit Trail (if required) | 2512

End REGISTER Method Administration Reply Process | 2514

2400

PEGISTER Method Administrative Reply Process Flow

Figure 43d

2520

AUDIT Method Administrative Request Process Flow

Start AUDIT Method Administrative Request Process

2522

Prime AUDIT Administrative Audit Trail

— Write →

2524

AUDIT Administrative Audit Trail

2526

Queue Request for Administrative Processing of AUDIT

— Write →

2528

AUDIT Administrative Request

230

Save AUDIT Administrative Audit Trail

— Write →

2532

AUDIT Administrative Audit Trail

Some time later

2534

Prime communications audit trail

— Write →

2536

Communications audit trail

2538

Write AUDIT Administrative Request(s) into Administrative Object

← Read —

2540

Specific UDE, Audit Trail UDE(s), and Administrative Request Record(s)

2546

End AUDIT Method Administration Request Process

2542

Save communications audit trail

— Write →

2544

Communications audit trail

Figure 44a

2520

AUDIT Method Administrative Response Process Flow

Start AUDIT Method Administrative Response Process

2550
Prime AUDIT Communications and Response Audit Trail

—Write—▷

2552
Communications and Response Audit Trail

2554
Unpack Admin. Object and retrieve AUDIT request(s), audit trail(s) and record(s)

—Write—▷

2556
AUDIT Administrative Request, Budget records, and audit information

2558
Retrieve request and determine the response method to run to process the request

◁—Read—

2560
Administrative Request

2562
Send event(s) contained in Request record(s) to the Response Method and generate Response records and Response request

—Read/Write—▷

2564
AUDIT Request and Response records

2566
Write AUDIT Administrative Response records into Administrative Object

◁—Read—

2568
AUDIT UDE(s) and Administrative Response Records

2574
End AUDIT Method Administration Response Process

2570
Save communications and response processing audit trail

—Write—▷

2572
Communications and response processing audit trail

Figure 44b

Start AUDIT Method
Administrative Reply
Process

2580

Prime AUDIT
Administrative and
Communications Audit
Trail

— Write →

2582

AUDIT
Administrative and
Communications
Audit Trail

2584

Extract Response
Records and
Requests from
Administrative
Object and write
Reply records to
the secure
database

— Write →

2586

AUDIT Reply
Records and
Requests

2588

Save AUDIT
Administrative and
Communications Audit
Trail

— Write →

2590

AUDIT
Administrative and
Communications
Audit Trail

Some time later

2592

Retrieve Reply record
and determine method
required to process it

← Read —

2594

AUDIT Reply
records

2595

Send event(s)
contained in Reply
record(s) to the
Reply method and
generate / update
database records

— Read/Write →

2596

secure database
records

2599

End AUDIT Method
Administration Reply
Process

2597

Delete Reply record(s)
from database

— Delete →

2598

AUDIT Reply
Record(s)

Figure 44c

FIG. 45

150

SYSTEM
EVENT
OCCURS

↓

EVENT METHOD — 402

↑ QUALIFIED EVENT

METER METHOD — 404

METER TRAIL INFORMATION ←

↑ EVENT METERED

BUDGET INFORMATION
METER INFORMATION
BILLING INFORMATION

BILLING METHOD — 406

↑ BILLING PROCESSED

BUDGET INFORMATION

BUDGET METHOD — 408

↑

CONTENT RELEASE AND/OR OTHER ACTION

EVENT QUALIFIED	EVENT METERED OR DISCARDED	EVENT BILLED	BUDGET DECREMENTED BY BILLED AMOUNT

METER INFORMATION →

BILLING TRAIL INFORMATION →

BUDGET TRAIL INFORMATION →

FIG. 46

SYSTEM EVENT
OCCURS

CONTROL SET
FROM PERC

CONTROL
METHOD

410

EVENT MAPPED TO ATOMIC ELEMENT

EVENT MAPPED TO ATOMIC ELEMENT 節

EVENT METERED OR DISCARDED

EVENT METERED

EVENT BILLED

BILLING PROCESSED

BUDGET DECREMENTED BY BILLED AMOUNT

404

406

408

EVENT
METHOD

METER
METHOD

BILLING
METHOD

BUDGET
METHOD

402

METER UDE

BILLING
TRAIL

BUDGET
UDE

METER TRAIL
UDE

BUDGET UDE
METER UDE
BILLING UDE

BUDGET TRAIL
UDE

FIG. 47

EVENT MAPPED TO
ATOMIC ELEMENT

SYSTEM EVENT
OCCURS

402

EVENT
METHOD

EVENT MAPPED
TO ATOMIC
ELEMENT #n

EVENT METERED
OR DISCARDED

EVENT BILLED

BUDGET DECREMENTED
BY BILLED AMOUNT

412

AGGREGATE METHOD

METER
METHOD
404

BUDGET
METHOD
406

BILLING
METHOD
408

METER TRAIL
UDE

METER
UDE

BUDGET UDE
METER UDE
BILLING UDE

BILLING
TRAIL UDE

BUDGET
TRAIL
UDE

BUDGET
UDE

FIG. 48

SYSTEM EVENT OCCURS

EVENT MAPPED TO ATOMIC ELEMENT

EVENT METERED OR DISCARDED

EVENT BILLED

BUDGET DECREMENTED BY BILLED AMOUNT

EVENT METHOD — 402

EVENT MAPPED TO ATOMIC ELEMENT #n

METER METHOD #1 — 404a
METER #1 TRAIL UDE
METER #1 UDE

METER METHOD #2 — 404b
METER #2 TRAIL UDE
METER #2 UDE

EVENT METERED

BILLING METHOD — 406
BUDGET UDE
METER UDE
BILLING UDE
BILLING TRAIL UDE

SEPARATE USE METER INDEPENDENT OF BILLING

BUDGET METHOD #1 — 408a
BUDGET #1 TRAIL UDE
BUDGET #1 UDE

BUDGET METHOD #2 — 408b
BUDGET #2 TRAIL UDE
BUDGET #2 UDE

1500

Start of OPEN Method
Process

OPEN Event

CONTROL Method

Create Read Channel
and establish read /
use controls

1502

OPEN Event
Atomic Element and Count

Atomic Element and Count
Meter Value

Meter Value
Billing Amount

Billing Value
Budget Value

EVENT
Method

1504

Read Channel

End of OPEN Method
Process

1510

BUDGET
Method

1508

BILLING
Method

1506

METER
Method

Secure
Database

610

Figure 49

1500

1502

Start of OPEN Method Process

OPEN Event

Determine identification of object and user to be opened.   ⌐1520

OPEN Event, Object ID, User ID

URT, PERC for (object, user)   ⌐1524

——Read——▶

Is the Object registered for this user?   ⌐1522

——No——▶

Call the REGISTER Method for the Object. Restart the OPEN Method once the registration is complete.   ⌐1526

Yes

Is the object already open for this user?   ⌐1528

No

OPEN Method Elements (Method core, LM, UDE, MDE)   ⌐1632

——Read——▶

Create channel and bind OPEN control elements to it   ⌐1530

Yes

OPEN Event, Object ID, User ID, Channel ID

Audit UDE   ⌐1534

◀——Write——

Prime Audit (if required)   ⌐1533

1536 ⌐   Start Secure Database Transaction

CONTROL Method

A

Figure 49a

1502

1504

A

1538

Prime EVENT Audit Trail (if required) —Write→ 1540 EVENT Method Audit Trail UDE

1542

Map OPEN Event to Atomic Element # and event count using Map MDE ←Read— 1544 EVENT Method Map MDE

Event, Event Count, Atomic Element #, Object ID, User ID

1546

Write EVENT Audit Trail (if required) —Write→ 1548 EVENT Method Audit Trail UDE

Atomic Element #, Event Count

Atomic Element Selected? 1550

—Yes, Pass—

—No, Fail EVENT Method—

EVENT Method

1552

EVENT Method Succeeded? —No→ Roll back secure database transaction —→ 1556 OPEN Method Failed

1554

Yes

B

CONTROL Method (cont'd)

Figure 49b

B 1502 1506

1558

Prime METER Audit Trail (if required) →Write→ METER Method Audit Trail UDE 1560

1564 Add EVENT Count to Meter value ←Read/Write→ METER Method UDE (the Meter) 1562

1566 Write METER Audit Trail (if required) →Write→ METER Method Audit Trail UDE 1568

METER Value

Meter increment succeeded? 1570

Yes, Pass

No, Fail METER Method

METER Method

1572 METER Method Succeeded? —No→ Roll back secure database transaction 1574 → OPEN Method Failed 1576

CONTROL Method (cont'd)

Yes

C

Figure 49c

C

1508

1578

Prime
BILLING
Audit Trail (if
required)

—Write→

1580

BILLING
Method Audit
Trail UDE

1582

Map Atomic
Element #, Count,
and Meter Value to
Billing Amount
using Map MDE

←Read—

1584

BILLING
Method Map
MDE (Price list)

Billing Amount

1586

Write BILLING
Audit Trail (if
required)

—Write→

1588

BILLING
Method Audit
Trail UDE

Billing Amount

1590

Billing Amount
Selected?

—Yes, Pass—

—No, Fail BILLING Method—

BILLING Method

1592

BILLING Method
Succeeded?

—No→

1594

Roll back secure
database transaction

→

1596

OPEN Method Failed

Yes

CONTROL Method (cont'd)

D

Figure 49d

D   1502

1510

1598

Prime
BUDGET
Audit Trail (if
required)

—Write→

BUDGET
Method Audit
Trail UDE

1600

1602

Add Billing Amount
to Budget value

←Read/Write→

BUDGET
Method UDE
(the Budget)

1604

1606

Write BUDGET
Audit Trail (if
required)

—Write→

BUDGET
Method Audit
Trail UDE

1608

1610

BUDGET value out
of range?

—Yes, FAILS—

—No, Fails—

BUDGET Method

1612

Budget Method
returns OK?

—No→

Roll back secure
database transaction

→

OPEN Method Failed

1616

1614

CONTROL Method (cont'd)

Yes

E

Figure 49e

1502

E

1618 — Write OPEN Audit Trail (if required) — Write → Audit UDE   1620

1622 — Establish channel for READ Event Processing ← Read — URT, PERC for (object, user)   1624

Channel ID

1626 — READ Channel Established? — No → Roll back secure database transaction   1628 → OPEN Method Failed   1630

Yes

1632 — Commit secure database transaction

1634 — Tear down channel for open processing (optional)

CONTROL Method (cont'd)

1636 — OPEN Method Process Completed

o

Figure 49f

READ
Method Use
Process Flow

1650

Figure 50

1650

Start of READ Method
Process

READ Event

Determine identification
of object and user ID
for read
— 1662

READ Event, Object ID, User ID

Is the Object open
for this user?
— 1664

No → Call the OPEN
Method for the
Object. Restart the
READ Method
once the
registration is
complete.
— 1666

Yes

Audit UDE
— 1672

← Write — Prime Audit (if
required)
— 1670

Start Secure Database
Transaction
— 1668

CONTROL Method

A

Figure 50a

1652

1654

Prime EVENT
Audit Trail (if
required) 1674

EVENT Method
Audit Trail UDE 1676

Write

Map READ Event to
Atomic Element # and
event count using Map
MDE 1678

Read

EVENT Method Map
MDE 1680

Event, Event Count, Atomic Element #, Object ID, User
ID

Write EVENT Audit
Trail (if required) 1682

EVENT Method
Audit Trail UDE 1684

Write

Atomic Element #, Event Count

Atomic Element
Selected? 1686

Yes,
Pass

No, Fail EVENT Method

EVENT Method

EVENT Method
Succeeded? 1688

Roll back secure
database transaction 1690

No

READ Method Failed 1692

Yes

CONTROL Method (cont'd)

B

A

Figure 50b

1652

1656

B

1694

Prime
METER
Audit Trail (if
required)

Write→

1656

METER Method
Audit Trail UDE

1698

Add EVENT Count
to Meter value

←Read/Write→

1700

METER Method
UDE (the
Meter)

1702

Write METER
Audit Trail (if
required)

Write→

1704

METER Method
Audit Trail UDE

METER Value

1706

Yes.
Pass

Meter increment
succeeded?

METER Method

No. Fail METER Method

1708

METER Method
Succeeded?

No→

Roll back secure
database transaction

1712

READ Method Failed

1710

CONTROL Method (cont'd)

C

Figure 50c

1652

1658

C

1714

Prime
BILLING
Audit Trail (if
required)

—Write→

1716

BILLING
Method Audit
Trail UDE

1718

Map Atomic
Element #, Count,
and Meter Value to
Billing Amount
using Map MDE

←Read—

1720

BILLING
Method Map
MDE (Price list)

Billing Amount

1722

Write BILLING
Audit Trail (if
required)

—Write→

1724

BILLING
Method Audit
Trail UDE

Billing Amount

1726

Billing Amount
Selected?

Yes,
Pass

No, Fail BILLING Method

BILLING Method

1728

BILLING Method
Succeeded?

—No→

1730

Roll back secure
database transaction

→

1732

READ Method Failed

Yes

CONTROL Method (cont'd)

D

Figure 50d

1562

D

1660

1734
Prime
BUDGET
Audit Trail (if
required)

Write →

1736
BUDGET
Method Audit
Trail UDE

1738
Add Billing Amount
to Budget value

←Read/Write→

1740
BUDGET
Method UDE
(the Budget)

1742
Write BUDGET
Audit Trail (if
required)

Write →

1744
BUDGET
Method Audit
Trail UDE

1746
BUDGET value out
of range?

—Yes, FAILS—

—No, PASS—

BUDGET Method

1748
Budget Method
returns OK?

No▶

Roll back secure
database transaction

1752
READ Method Failed

1706

CONTROL Method (cont'd)

Yes

E

Figure 50e

E

Write OPEN Audit Trail (if required) [1754]

—Write→ Audit UDE [1756]

Determine key to use to decrypt content [1758]

←Read— PERC for (object, user) [1760]

Obtain encrypted content using ACCESS Method [1762]

Decrypt content using DECRYPT method [1764]

CONTROL Method (cont'd)

Fingerprint desired [1766] —Yes→ Call FINGERPRINT Method [1768]

No

Obscure desired [1770] —Yes→ Call OBSCURE Method [1772]

No

Commit secure database transaction [1774]

READ Method Proces Completed [1776]

1780

Figure 51

1780

1782

Start of WRITE Method Process [1792]

WRITE Event

Determine identification of object and user ID for read [1794]

WRITE Event, Object ID, User ID

Is the Object open for this user? [1796]

—No— Call the OPEN Method for the Object. Restart the WRITE Method once the registration is complete. [1798]

Yes

Audit UDE [1804] ←Write— Prime Audit (if required) [1802]

Start Secure Database Transaction [1800]

A

Figure 51a

1782

1784

1806

Prime EVENT
Audit Trail (if
required) —Write—▷ EVENT Method
Audit Trail UDE

1808

1810

Map WRITE Event to
Atomic Element # and
event count using Map
MDE ◁—Read— EVENT Method Map
MDE

1812

Event, Event Count, Atomic Element #, Object ID, User
ID

1814 --- Write EVENT Audit
Trail (if required) —Write—▷ EVENT Method
Audit Trail UDE

1816

Atomic Element #, Event
Count

Atomic Element
Selected? —No—▷ Update EVENT Method
Map MDE to reflect
new data

1818

1820

Yes,
Pass

◁——————PASS if update succeeded, FAIL otherwise——————

EVENT Method

EVENT Method
Succeeded? —No—▷ Roll back secure
database transaction —▷ WRITE Method Failed

1822

1824

1826

Yes

CONTROL Method (cont'd)

A

B

Figure 51b

B

1782

1786

Prime
METER
Audit Trail (if
required) — 1828

Write → METER Method
Audit Trail UDE — 1830

Add EVENT Count
to Meter value — 1834

←Read/Write→ METER Method
UDE (the
Meter) — 1836

Write METER
Audit Trail (if
required) — 1838

Write → METER Method
Audit Trail UDE — 1840

METER Value

Meter increment
succeeded? — 1842

—Yes, Pass—

—No, Fail METER Method—

METER Method

1844 — METER Method
Succeeded?

—No→ Roll back secure
database transaction

→ WRITE Method Failed — 1848

1846

CONTROL Method (cont'd)

C

Figure 51c

1782

1788

C

Prime
BILLING
Audit Trail (if
required) —Write→ BILLING
Method Audit
Trail UDE

1850   1852

Map Atomic
Element #, Count,
and Meter Value to ←Read— BILLING
Billing Amount   Method Map
using Map MDE   MDE (Price list)

1854   1856

Billing Amount

Write BILLING
Audit Trail (if
required) —Write→ BILLING
Method Audit
Trail UDE

1858   1860

Billing Amount

Billing Amount
Selected?

1862

Yes,
Pass

—No, Fail BILLING Method—

BILLING Method

1864

BILLING Method
Succeeded?

—No→ Roll back secure
database transaction —→ WRITE Method Failed

1868

1866

Yes

CONTROL Method (cont'd)

D

Figure 51d

Figure 51e

1920

CLOSE Method Process Flow

```
   ┌────────────────────┐
   │ Start CLOSE Method │
   │      Process       │
   └────────────────────┘
              │
              ▼                    1922                         1924
   ┌────────────────────┐                        ┌────────────────────┐
   │  Prime  Audit trail│ ──Write──────►         │     Audit UDE      │
   │    (if required)   │                        │                    │
   └────────────────────┘                        └────────────────────┘
              │
              ▼                    1926
   ┌────────────────────┐
   │ Destroy channel and│
   │  release resources │
   └────────────────────┘
              │
              ▼                    1928                         1930
   ┌────────────────────┐                        ┌────────────────────┐
   │  Write Audit Trail │ ──Write──────►         │     Audit UDE      │
   │    (if required)   │                        │                    │
   └────────────────────┘                        └────────────────────┘
              │
              ▼
   ┌────────────────────┐
   │  End CLOSE Method  │
   │      Process       │
   └────────────────────┘
```

Figure 52

1782

E

1890
Write WRITE Audit Trail (if required)

—Write→

1892
Audit UDE

1894
Determine key to use to encrypt content

←Read—

1896
PERC for (object, user)

1898
Encrypt content using ENCRYPT method

CONTROL Method (cont'd)

1900
Write content to object using ACCESS method

1904
Commit secure database transaction

1902
Update container TOC and related information

1906
WRITE Method Process Completed

Figure 51f

Sample EVENT Method Mapping Process

Figure 53b

EVENT Method Process Flows

1940

EVENT Method Start

EVENT, Event Count, Event Parameters

1942 Prime EVENT Audit Trail (if required) —Write→ 1944 EVENT Method Audit Trail UDE

1946 Load MAP MDE DTD ←Read— 1948 EVENT Method Map DTD

1950 Map Event to Atomic Element # and event count using Map MDE ←Read— 1952 EVENT Method Map MDE

ent, Event Count, Atomic Element #, Object ID, User ID

1970 Write EVENT Audit Trail (if required) —Write→ 1972 EVENT Method Audit Trail UDE

Atomic Element #, Event Count

1974 Atomic Element Selected? —No→ 1976 EVENT Method failed

1978 EVENT Method Succeeded

Figure 53a

ACCESS Method Process Flow

Figure 54

BILLING
Method
Process
Flows

1980

BILLING Method Start

Meter Value

1982
Prime BILLING
Audit Trail (if
required)

—Write→

1984
BILLING Method
Audit Trail UDE

1985
Load MAP MDE DTD

←Read—

1986
BILLING Method
Map DTD

1988
Map meter value to
billing amount using
Map MDE (and
possibly database
elements)

←Read—

1989
BILLING Method
Map MDE (and
optionally others)

Billing Amount

1990
Write BILLING Audit
Trail (if required)

—Write→

1992
BILLING Method
Audit Trail UDE

1994
Billing Amount
Selected?

—No→

1996
BILLING Method failed

Billing amount 1998

BILLING Method
Succeeded

Figure 53c

ENCRYPT
Method
Process Flow

2050

Start ENCRYPT
Method

Block to Encrypt — 2052

Determine key to
use from key block

2054

Load key from PERC
or
Add key to PERC

←Read/Write→ PERC   2056

2058

Convolute key (if
required)

2060

Encrypt block

Encrypted block   2062

End of ENCRYPT
block

Figure 55b

DECRYPT
Method
Process Flow

Start DECRYPT
Method

Block to decrypt ⌐2032

Select key number
from key block

⌐3034

Load key from PERC ◄─Read── PERC ⌐2036

⌐2038

Convolute key (if
required)

⌐2040

Decrypt block

Decrypted block ⌐2042

End of DECRYPT
Method

Figure 55a

2080

EXTRACT Method Process Flow

Start EXTRACT Method Process

Object ID, Source container ID

2082

Prime Audit ←Read— Audit UDE **2084**

Call BUDGET method to check extract budget for original object **2086**

Budget permits extraction? **2088**

—No→ Write Failure Audit record **2090** → End of EXTRACT Method **2092**

Yes

Create copy of extracted object with specified controls (this is a call to a method that controls the copy) **2094**

Control changes permitted by extract rights? **2096**

—Yes→ User specific new or changed controls and calls a method to create a new PERC that reflects these controls **2104** ←User Input— Display **2106**

2098 No→

Write Audit → Audit UDE **2100**

End of EXTRACT Process **2102**

Figure 57a

CONTENT
Method
Process Flow

Figure 56

2140

OBSCURE
Method
Process Flow

Start OBSCURE
Method

Call EVENT
Method to
determine if
content is in range
to be obscured
2142

Was content in
range for obscure? — No → End of OBSCURE
Method
2144   *2146*

Yes

First time in for this
method? — No
2148

Yes

Load obscure formula
and patterns ← Read — OBSCURE Method
MDE(s)
2150   *2152*

Apply transform ←
2154

End of OBSCURE
Method
2156

Figure 58a

2110

EMBED
Method
Process Flow

Start EMBED Method
Process

Object ID, Destination container
ID

2112

Prime Audit ◄—Write— Audit UDE 2114

Call BUDGET
method to check
embed budget for
destination object 2116

Budget permits
embedding? 2118 —No→ Write Failure Audit
record 2120 → End of EMBED Method 2122

Write object into
destination
container,
abstracting
controls (calling a
method to abstract
or change the
controls) 2124

Control changes
permitted by
embed rights? 2126 —Yes→ User specifis new
or changed
controls and calls a
method to create a
new PERC that
reflects these
controls 2128 ◄—User Input— Display 2130

No

Write Audit 2132 ——→ Audit UDE 2134

Figure 57b

End of EMBED
Process 2136

300

ENCRYPTED
CONTENT

EXTRACT

"FINGERPRINT"
METHOD 2160

2161(1)

2161(2)

2161(3)

EXTRACTED
CONTENT

FIG. 58C

2160

FINGERPRINT Method Process Flow

Start FINGERPRINT Method

2162

Call EVENT Method to determine if content is in range to be fingerprinted

2164

Was content in range for fingerprint?

No → 2166 End of FINGERPRINT Method

Yes

2168

First time in for this method?

No

Yes

2170

Load fingerprint formula and patterns ← Read ← 2172 FINGERPRINT Method MDE(s)

2174

Apply transform

2176

End of FINGERPRINT Method

Figure 58b

2200

PANIC
Method
Process Flow

Start of PANIC Method

2202
Prime Audit —Write→ Audit UDE 2204

2206
Call CLOSE
Method to close
the channel

2208
Mark controls as
damaged —Write→ URT, PERC(s) 2210

2212
Write Audit —Write→ Audit UDE 2214

2216
End of PANIC Method

Figure 60

DESTROY
Method
Process Flow

Start of DESTROY
Method

2182

Prime Audit ──Write──▶ Audit UDE

2184

2186

Call ACCESS
Method to write
garbage at head of
object

2188

Mark URT or other
control structures as
damaged ──Write──▶ URT or other
control structures

2190

2192

Write Audit ──Write──▶ Audit UDE

2194

2196

End of DESTROY
Method

Figure 59

FIG. 62

KEY CONVOLUTION PROCESS

SECRET KEY
CONVOLUTION SEED
VALUE ⟋ 2861

2821

SITE ID

IN

RTC 528
HIGH BITS

V

DES ⟋ 2871

OUT

CURRENT
CONVOLUTIION
KEY ⟋ 2862

KEY

810

CONTENT KEY FROM
PERC 808

IN

DES

2872

OUT

ACTUAL
CONTENT
KEY ⟋ 2863

2220

METER Method Use Process Flow

Start METER Method Use Process

Atomic Element, Event Count

2222 Prime METER Audit Trail

—Write→ **2224** METER Audit Trail UDE

2226 Obtain DTD for METER

←Read— **2228** DTD for METER UDE

2230 Obtain METER

←Read— **2232** METER UDE

2234 METER Audit date expired (time)?

—Yes→ **2236** Commit METER Failure Audit Record

→ **2238** METER Method Failed

No

2239 Update METER using Atomic Element and count

—Write→ **2240** METER UDE

2242 Save METER Use Audit Record

—Write→ **2244** METER Audit Trail UDE

2246 METER Method Succeeded

Figure 61

FIG. 64   SPU KEY INITIALIZATION/INSTALLATION

RTC 528 OF CREATOR

CONVOLVE

2871(Z)

2862(Z)

CK REAL

CREATOR

USER

2862(A)

CK -2

2862(B)

CK -1

2862(C)

CK 0

2862(D)

CK +1

2862(E)

CK +2

2871(A)

CONVOLVE

2871(B)

CONVOLVE

2871(C)

CONVOLVE

2871(D)

CONVOLVE

2871(E)

CONVOLVE

2881(A)

RTC - 2Δ

2881(B)

RTC -Δ

2881(C)

RTC

2881(D)

RTC +Δ

2881(E)

RTC + 2Δ

FIG. 63

CLOCK OFFSET RESOLUTION WITH KEY CONVOLUTION

FIG. 66   STATIONARY OBJECT DECRYPTION

FIG. 65 KEY INSTALLATION & UPDATE

PRIV HDR KEYS — 2831

EXT. COMM KEYS — 2832

ADMIN OBJ KEYS — 2833

OTHER SHARED KEYS — 2834

VDE CERTIF DB

SITE PUB KEY 2813
FROM SITE CERT 2823

PK ENCRYPT — 2841

2804

PK DECRYPT — 2842

SITE PRIV KEY 2816

SECURE NON-VOLATILE KEY STORAGE

2802

PPE 650
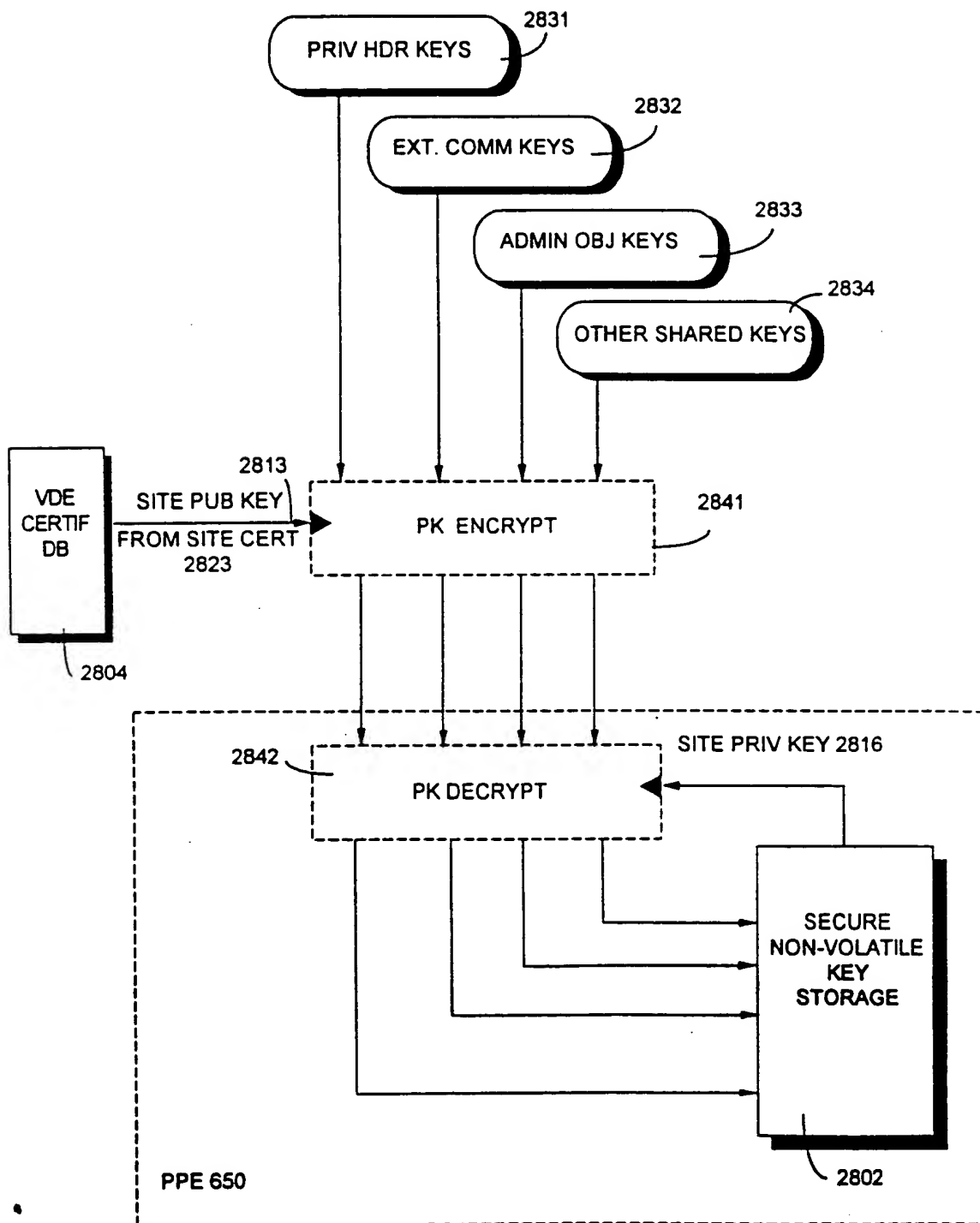
FIG. 68
SPU INITIALIZATION

1370

START

RESET
SPU — 1372

ESTABLISH
SECURE
COMMUNICATIONS — 1374

UPDATE
SPU INTERNAL
BOOTSTRAP — 1376

DOWNLOAD
FIRMWARE
INTO SPU — 1378

DOWNLOAD
UNIQUE DEVICE
ID INTO SPU — 1380

DOWNLOAD/INIT.
KEYS, TAGS
AND CERTIFICATES — 1382

INITIALIZE
SPU
REAL TIME CLOCK — 1384

INITIALIZE
SUMMARY
VALUES — 1386

INITIALIZE
SECURE
DATABASE — 1388

END

PPE 650

SECURE NV KEY
STORAGE   2802

PRIVATE HEADER
KEY 2831

SECURE FILE/
DATABASE KEY 2817

2844

ENCRYPT

TRAVELING
OBJECT
860

DECRYPT

PERC
880

PRIVATE BODY KEY
FROM PERC 810

2843

ENCRYPTED
CONTENT

DECRYPT

2845

SECURE DB
610

CONTENT

FIG. 67 TRAVELING OBJECT DECRYPTION

2630

600(1)
654(1)
653(1)
2632(1)
2634(1)
2631
(672)

CPU

INTER-
FACE/
CTRL

CONN

ROM

RAM

SPU

658(1)
656(1)
500(1)

654(2)
2632(2)

600(2)
2636
STORAGE
MECHANISM
μ CONTROLLER
2634(2)

653(2)
INTER-
FACE/
CTRL
CONN.

620
BUS

ROM
RAM
SPU

658(2)
656(2)
500(2)

614
654(3)
2632(3)

600(3)
2638
DISPLAY
MECHANISM
μ CONTROLLER
2634(3)

653(3)
INTER-
FACE/
CTRL
CONN.

BUS

ROM
RAM
SPU

658(3)
656(3)
500(3)

600(N)
622
654(N)
2632(N)

2640
PRINT
MECHANISM
μ CONTROLLER
2634(N)

653(N)
INTER-
FACE/
CTRL
CONN.

BUS

ROM
RAM
SPU

658(N)
656(N)
500(N)

FIG. 70

FIG. 69

SPU FIRMWARE
DOWNLOAD

LOG IN USER INTERFACE ⌐   182

USER NAME: │ SHEAR, V.   │   ┌──────────┐
                                                │ LOGIN   │
                                                └──────────┘
PASSWORD: │ ✶ ✶ ✶ ✶ ✶   │   ┌──────────┐
                                                │ CANCEL │
                                                └──────────┘
  ☐ LOGIN AT STARTUP   ┌──────────┐
                                                │   HELP   │
                                                └──────────┘

FIG. 72A

FIG. 72B

                                                    2660
                                                ┌──────────┐
  ⚠   YOU HAVE REQUESTED THESE   │ CANCEL │
         PROPERTIES: └──────────┘

  LOONEY TUNES NEWS!   ┌──────────┐   ┌──────────┐
                              │ APPROVE │   │ SUSPEND │
                              └──────────┘   └──────────┘
                                 2662
┌─────────────────┐
│ PROPERTY INFO │   Your Cost: $7.50   MORE OPTIONS ⌡
└─────────────────┘

                                                    2664

FIG. 71

PORTABLE APPLIANCE

FIG. 72D

⚠️ (warning triangle icon)
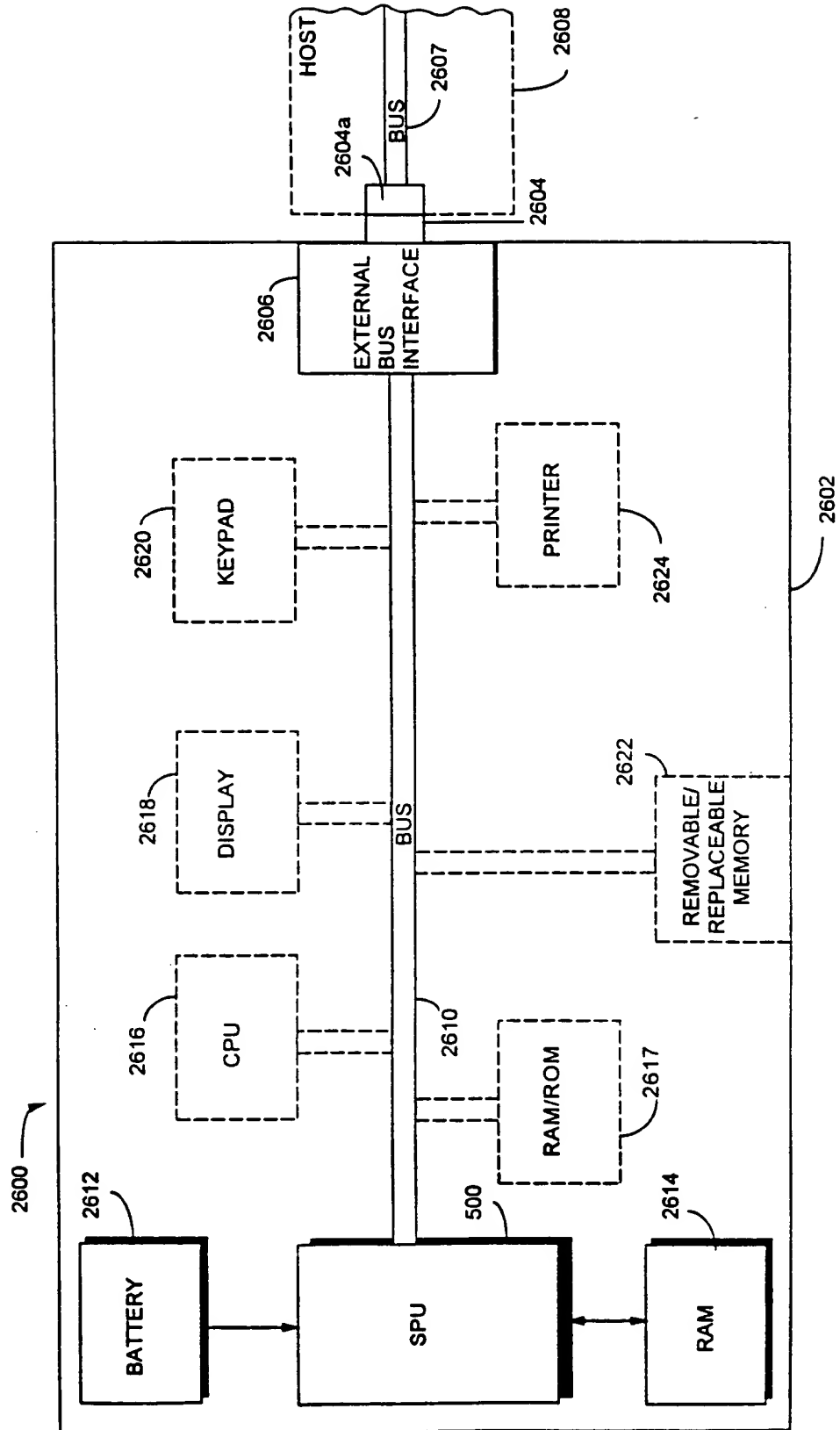
YOU HAVE REQUESTED THESE PROPERTIES:
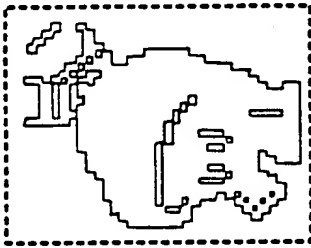
LOONEY TUNE NEWS!

| PROPERTY INFO |

YOUR COST : $7.50

| CANCEL |

| APPROVE | | SUSPEND |

More Options ▯ ⊠   Show Thumbnail

PROPERTY:	SIZE:	AMOUNT:	UNITS:	PUBLISHER:	COST/UNIT:	TYPE:	USE?:	LINKS:	HIST:
CHUCK JONES BIOGRA...	256KB	64	KBYTE	WARNER NEW MEDIA	$1.25	PREVIEW	✓	◄	●
▼ BUGS BUNNY.JPE...	1MB	1	RECORD	WARNER NEW MEDIA	$5.00	DISPLAY	✓	◄	●
BUGS BUNNY.JPEG...	1MB	10	RECORD	WARNER NEW MEDIA	$3.50	DISPLAY		◄	●
BUGS BUNNY.JPEG...	1MB	25	RECORD	WARNER NEW MEDIA	$2.50	DISPLAY			●
FRIZ FRELENG BIOGRA...	256KB	120	SECTOR	WARNER NEW MEDIA	$5.00	PRINT			
TEX AVERY BIOGRAP...	256KB	50	PERCENT	WARNER NEW MEDIA	$2.50	COPY		◄	
▲ DUCKI RABBITI DU...	64MB	7.0	MINUTE	WARNER NEW MEDIA	$7.50	COPY-PRO			
MEL BLANC BIOGRAPH...	256KB	1	SPECIAL	WARNER NEW MEDIA	$25.25	INSTALL		◄	
LOONEY TUNES DATAB...	600MB	1	OBJECT	WARNER NEW MEDIA	$2000.00	ALL		◄	●

| SET LIMITS... | SHOW BUDGETS | ACQUIRE BUDGET... | HISTORY... | TRANSFER... | PREFERENCES... | FEEDBACK... | HELP! |

FIG. 72C

SET LIMITS:

SESSION DOLLAR LIMIT: $ [50]   ▲▼   [OK]

TRANSACTION DOLLAR LIMIT: $ [50]   [CANCEL]

TIME LIMIT (IN MINUTES): [50]

UNIT LIMIT: [50]   [HELP!]

2666

2674

2668

2670

2672

FIG. 74

SOFTWARE DESCRIPTION LIST DATABASE

VDE SITE WITH AGENT EXECUTION SERVICE AND SOFTWARE DESCRIPTION LIST DATABASE

3016

SOFTWARE DESCRIPTION LIST DATABASE

3020

VDE SITE WITH AGENT EXECUTION SERVICE AND SOFTWARE DESCRIPTION LIST DATABASE

SMART OBJECT SEND TO SECOND VDE SITE AFTER FAILURE ON FIRST VDE SITE

3022

SMART OBJECT WITH DESIRED INFORMATION RETURNS TO SENDER

3018

INFORMATION LOCATOR DATABASE

VDE SITE WITH INFORMATION LOCATOR SERVICE

SMART OBJECT SENT TO VDE SITE DESIRED SERVICES

3012

3024

SMART OFJECT SENT TO DETERMINE LOCATION OF DATABASE TO USE

USER VDE SITE

3014

3010

FIG. 73

3000

300			
PUBLIC HEADER			802
PRIVATE HEADER			804
PRIVATE BODY			806

806a →	**RULES FOR CONTAINER 300**	**RULES FOR RIGHTS NEGOTIATION**	**RULES FOR CONTAINER 300w** ← 806c
806b →			
806d →	**RULES FOR CONTAINER 300x**	**RULES FOR CONTAINER 300y**	**RULES FOR CONTAINER 300z** ← 806f
806e →			

CONTENT OBJECT		**RULES FOR AGENT EXECUTION** ← 300z(1)
300z → **SOFTWARE AGENT**		← 300z(2)
CONTENT OBJECT		**RULES FOR INFORMATION SEARCH** ← 300y(1)
300y → **INFORMATION (ROUTING) LOCATIONS AND RELATED DATA**		← 300y(2)
CONTENT OBJECT		**RULES FOR INFORMATION RETRIEVED** ← 300x(1)
300x → **INFORMATION RETRIEVED**		← 300x(2)
ADMIN. OBJECT		**RULES FOR AUDIT RETURNED** ← 300w(1)
300w → **AUDIT HISTORY OF AGENT EXECUTION**		← 300w(2)

FIG. 75B

3125

PERC HEADER	CSO	PRIVATE BODY KEYS

3127 —

USE RIGHT HDR	CSR	KEYS

CSR

3129

DESIRED METHOD, BUDGET

3142 —

METHOD OPTION: VISA	DESIRED UDE: MYVISABUDGET

3143

REQUIRED METHOD, BILLING (<$150 FIXED, ONE TIME)

3133

DESIRED CONTROL SET (USE WITH INFO. PASSBACK)	CONTROL METHOD (VENDING WITH "RESPONSE CARD")

3131a

REQUIRED METHOD, AUDIT (COLLECTION PERSONAL INFORMATION)

3135

PERMITTED FIELDS	

3137

REQUIRED METHOD, BILLING (<$30, FIXED, ONE TIME)

3139

PERMITTED CONTROL SET (USE W/O INFO PASSBACK)	CONTROL METHOD (VENDING)

3141

3131b

FIG. 75A

PERC HEADER	CSO	PRIVATE BODY KEYS
USE RIGHT HDR	CSR	KEYS

PERMITTED CONTROL SET (USE W/O INFO. PASSBACK)	CONTROL METHOD (VENDING)

REQUIRED METHOD, BUDGET

METHOD OPTION: VISA	METHOD OPTION: MASTERCARD	METHOD OPTION: AMEX

REQUIRED METHOD, BILLING ($100 FIXED, ONE TIME)

DESIRED CONTROL SET (USE WITH INFO. PASSBACK)	CONTROL METHOD (VENDING WITH "RESPONSE CARD")

REQUIRED METHOD, BUDGET

METHOD OPTION: VISA	METHOD OPTION: MASTERCARD	METHOD OPTION: AMEX

REQUIRED METHOD, AUDIT (COLLECTION PERSONAL INFORMATION)

REQUIRED FIELDS	DESIRED FIELDS	

REQUIRED METHOD, BILLING ($25 FIXED, ONE TIME)

Labels: 3104, 3106, 3100, 3118, 3102a, 3108, 3110, 3120, 3102b, 3112, 3114, 3116, 3116

FIG. 75D

URT HEADER	CSO	DIGITAL SIGNATURE	3160

USE RIGHT HDR	CSR

CONTROL SET(USE WITH INFO. PASSBACK)	CONTROL METHOD(VENDING WITH "RESPONSE CARD")

3162

REQUIRED METHOD, BUDGET		
METHOD OPTION: VISA	DESIRED UDE: MYVISABUDGET	

3164

REQUIRED METHOD, AUDIT (COLLECTION PERSONAL INFORMATION)	
PERMITTED FIELDS	

3166

REQUIRED METHOD, BILLING($25, FIXED, ONE TIME)

3170

FIG. 75C

3150

PERC HEADER	CSO	PRIVATE BODY KEYS

NEGOTIATE RIGHT HDR	CSR	KEYS

3156

3152 — PERMITTED CONTROL SET (TRUSTED NEGOTIATOR) | CONTROL METHOD (NEGOTIATE)

3154a

REQUIRED UDE PERC1	REQUIRED UDE: PERC2

3157a
3157b

3158

PERMITTED CONTROL SET (MULTIPLE NEGOT. PROCESSES)	CONTROL METHOD (NEGOTIATE)

3156

REQUIRED METHOD: NEGOTIATE1

REQUIRED UDE: PERC1	

3154b

REQUIRED METHOD: NEGOTIATE2

REQUIRED UDE: PERC2	

3158

FIG. 76A

PERC 1 — 808a

PERC N — 808n

RULES SET 1 • • • RULES SET N

SHARED NEGOTIATION
PROCESS
3172

NEGOTIATION
PROCESS RULES
AND CONTROLS

3150

ELECTRONIC CONTRACT 1   ELECTRONIC CONTRACT 2

PERC/URT 1 • • • PERC/URT N

3160a   3160n

ELECTRONIC
CONTRACT

3202(1) ———— CLAUSE 1

FIG. 75E

3202(2) ———— CLAUSE 2

. . .

3202(N) ———— CLAUSE N

3200

DIGITAL
SIGNTURE   o o o   DIGITAL
SIGNATURE

3204(1)   3204(M)

3206

3208(1) ——— STEP 1

3208(2) ——— STEP 2

FIG. 75F

3208(3) ——— STEP 3

3208(4) ——— STEP 4   STEP 5

3208(5)

o

FIG. 77

ELECTRONIC CONTENT HIGHWAY

108

CONTENT

100

102 — VDE CONTENT CREATOR

104

122

VDE RIGHT/ DISTRIBUTOR

700

106

110

CLIENT ADMINISTRATOR

REPORTS AND PAYMENTS

REPORTS

112(1)   112(2)   112(n)

VDE USER TWO   · · ·

VDE USER ONE   VDE USER N

112

BILLS   118

REPORTS

114

116a

FINANCIAL CLEARINGHOUSE

PAYMENTS   120

VDE ADMINISTRATOR

116b

FIG. 76B

3150a

NEGOTIATION
PROCESS RULES
AND CONTROLS

808a

PERC 1

808n

PERC N

3150n

NEGOTIATION
PROCESS RULES
AND CONTROLS

RULES SET 1

RULES SET N

3172A

NEGOTIATION
PROCESS 1

• • •

NEGOTIATION
PROCESS N

3172N

ELECTRONIC CONTRACT 1

ELECTRONIC CONTRACT 2

PERC/URT 1

• • •

PERC/URT N

3160a

3160n

FIG. 79

FIG. 78

FIG. 81

CREATOR B
C_B

USER B
$U_B(C_B)$

DISTRIBUTOR A
$D_A(C_B)$

DISTRIBUTOR C
$D_C(C_B)$

USER/DISTRIBUTOR A
$UD_A(C_B)$

DISTRIBUTOR B
$D_B(D_C(C_B))$

USER A
$U_A(D_A(C_B))$

USER B
$U_B(D_A(C_B))$

USER/DISTRIBUTOR A
$UD_A(D_A(C_B))$

USER/DISTRIBUTOR B
$UD_B(UD_A(C_B))$

USER B
$U_B(D_C(C_B))$

USER E
$U_E(D_B(D_C(C_B)))$

USER/DISTRIBUTOR B
$UD_B(UD_A(D_A(C_B)))$

USER B
$U_B(UD_B(UD_A(C_B)))$

USER B
$U_B(D_B(D_C(C_B)))$

CLIENT ADMINISTRATOR
$CA(D_B(D_C(C_B)))$

USER/DISTRIBUTOR C
$UD_C(CA(D_B(D_C(C_B))))$

USER B
$U_B(UD_B(UD_A(D_A(C_B))))$

USER C
$U_C(CA(D_B(D_C(C_B))))$

USER D
$U_D(CA(D_B(D_C(C_B))))$

USER D
$U_D(UD_C(CA(D_B(D_C(C_B)))))$

USER E
$U_E(CA(D_B(D_C(C_B))))$

FIG. 80

```
            ┌─────────────────────────┐
            │     CREATOR A           │
            │     C_A                 │
            └─────────────────────────┘
                        ↕
            ┌─────────────────────────┐
            │   DISTRIBUTOR A         │
            │   D_A (C_A)             │
            └─────────────────────────┘
         ↙              ↕              ↘
┌──────────────┐ ┌──────────────┐ ┌────────────────────────┐
│  USER A      │ │  USER B      │ │  USER/DISTRIBUTOR A    │
│  U_A(D_A (C_A))│ │ U_B(D_A (C_A))│ │ UD_A(D_A (C_A))       │
└──────────────┘ └──────────────┘ └────────────────────────┘
                                              ↕
                                  ┌────────────────────────┐
                                  │  USER/DISTRIBUTOR B    │
                                  │  UD_B(UD_A(D_A(C_A)))  │
                                  └────────────────────────┘
                                              ↕
                                  ┌────────────────────────┐
                                  │  USER B                │
                                  │  U_B(UD_B(UD_A(D_A(C_A))))│
                                  └────────────────────────┘
```

FIG. 83

CREATOR D
C_D

CREATOR B
C_B

DISTRIBUTOR C
$D_C(C_B C_C C_D)$

CREATOR C
C_C

USER B
$U_B(D_C(C_B C_C C_D))$

DISTRIBUTOR B
$D_B(D_C(C_B C_C C_D)C_E)$

CREATOR E
C_E

USER B
$U_B(D_B(D_C(C_B C_C C_D)C_E))$

CLIENT ADMINISTRATOR
$CA(D_B(D_C(C_B C_C C_D)C_E))$

USER E
$U_E(D_B(D_C(C_B C_C C_D)C_E))$

USER C
$U_C(CA(D_B(D_C(C_B C_C C_D)C_E)))$

USER/DISTRIBUTOR C
$UD_C(CA(D_B(D_C(C_B C_C C_D)C_E)))$

USER D
$U_D(CA(D_B(D_C(C_B C_C C_D)C_E)))$

USER E
$U_E(CA(D_B(D_C(C_B C_C C_D)C_E)))$

USER D
$U_D(UD_C(CA(D_B(D_C(C_B C_C C_D)C_E))))$

FIG. 82

CREATOR C
C_c

DISTRIBUTOR B
$D_B(C_c)$

DISTRIBUTOR C
$D_c(C_c)$

USER E
$U_E(D_B(C_c))$

USER/
DISTRIBUTOR C
$UD_c(CA(D_B(C_c)))$

USER D
$U_D(UD_c(CA(D_B(C_c))))$

CLIENT
ADMINISTRATOR
$CA(D_B(C_c))$

USER B
$U_B(D_B(C_c))$

USER E
$U_E(CA(D_B(C_c)))$

USER D
$U_D(CA(D_B(C_c)))$

USER C
$U_C(CA(D_B(C_c)))$

DISTRIBUTOR B
$U_B(D_c(C_c))$

USER B
$U_B(D_c(C_c))$

USER E
$U_E(D_B(D_c(C_c)))$

CLIENT
ADMINISTRATOR
$CA(D_B(D_c(C_c)))$

USER B
$U_B(D_B(D_c(C_c)))$

USER/
DISTRIBUTOR C
$UD_c(CA(D_B(D_c(C_c))))$

USER D
$U_D(UD_c(CA(D_B(D_c(C_c)))))$

USER E
$U_E(CA(D_B(D_c(C_c))))$

USER D
$U_D(CA(D_B(D_c(C_c))))$

USER C
$U_C(CA(D_B(D_c(C_c))))$

FIG. 85

300(A)

| DISPLAY |
| EDIT |
| EXTRACT |
| DISTRIBUTE |
| BUDGET = $22,000 |
| PRINT |

300(B)

| DISPLAY |
| PRINT |
| DISTRIBUTE |
| BUDGET = $8,000 |

CLIENT ADMINISTRATOR ⟶ 3450

3452(1)

SALES & MARKETING ADMINISTRATOR

A
| DISPLAY |
| BUDGET = $2,000 |
| DISTRIBUTE |

B
| DISPLAY |
| PRINT |
| BUDGET = $3,000 |
| DISTRIBUTE |

3452(2)

PLANNING ADMINISTRATOR

A
| DISPLAY |
| EDIT |
| BUDGET = $10,000 |
| DISTRIBUTE |

· · ·

3452(K)

RESEARCH & DEVELOPMENT ADMINISTRATOR

A
| DISPLAY |
| EXTRACT |
| BUDGET = $10,000 |
| PRINT |
| DISTRIBUTE |

B
| DISPLAY |
| BUDGET = $5,000 |
| DISTRIBUTE |

· · ·

3454(1)

USER 1

A
| DISPLAY |
| BUDGET = $200 |

3454(2)

USER 2

A
| DISPLAY |
| BUDGET = $100 |

USER 5

A
| DISPLAY |
| EDIT |
| BUDGET =$1000 |

B
| DISPLAY |
| BUDGET =$1000 |

3454(N)

USER N

A
| DISPLAY |
| PRINT |
| BUDGET =$500 |

B
| DISPLAY |
| BUDGET =$100 |

3454(5)

3454(3)

USER 3

B
| DISPLAY |
| BUDGET = $400 |

3454(4)

USER 4

A
| DISPLAY |
| BUDGET = $100 |

3454(6)

USER 6

A
| DISPLAY |
| EXTRACT |
| BUDGET = $1000 |

FIG. 84

FIG. 87

FIG. 86

UNENCRYPTED CONTENT

USAGE PERMISSION

ENCRYPTED CONTENT

CREATOR 102

3502

DISTRIBUTION PERMISSION

3500

USAGE PERMISSIONS

CONTENT

USER 112c

USER 112b

USER 112a

DISTRIBUTION PERMISSIONS

CONTENT & USAGE PERMISSIONS

200g

COMMERCIAL CONTENT REPOSITORY

USER 112f

USER 112e

112d

POWER USER 3504

DESKTOP

LAPTOP 3506

SETTOP 3508

CONTENT & REDISTRIBUTION PERMISSIONS

700

FIG. 86A

ENCRYPTION LAYER

KEY

PERMISSION RULES & CONTROLS

702

CORPORATE CONTENT REPOSITORY

USAGE PERMISSIONS

USER 112j

USER 112k

CONTENT

USER 112g

USER 112h

USER 112i

REDISTRIBUTION PERMISSIONS

704

DEPT. CONTENT REPOSITORY

USAGE PERMISSIONS